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Canada's Personal Computing Magazine

May 1985

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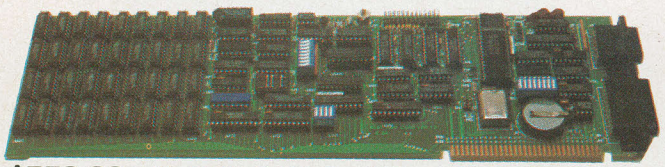

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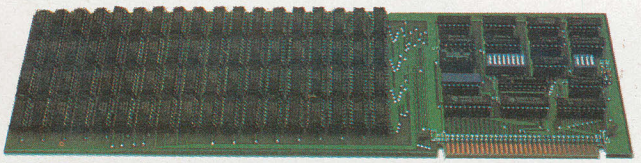

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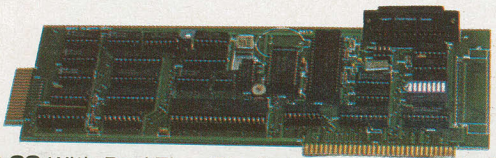

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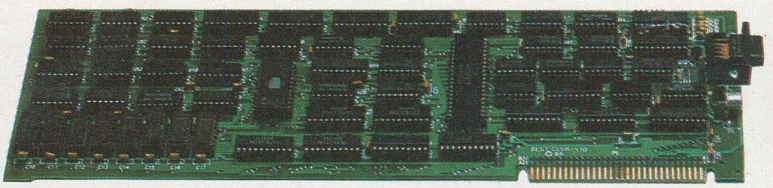

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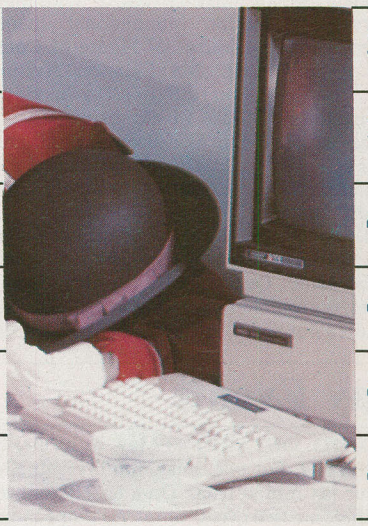

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Sectors

COMPUTER PRESS

Counterfeit Software

SPECIAL — From information received by Bruce Hampson, General Manager of the *Canadian Computer Dealer Association*, Computing Now! requested and received a news release from Constable W.C.C. Crich of the Toronto General Investigation Section of the Royal Canadian Mounted Police. The news was released by Sergeant M. Prokopchuk, and is reproduced here in its entirety:

A five month investigation by the R.C.M.P. into the manufacture and sale of 6,000 pieces of a counterfeit game, "Flight Simulator II for the Commodore 64 Computer", lead to the appearance in court on 27 March 1985 of Mark Herzog of Thornhill, Director of Questar International Incorporated, and Co-Director of House of Computers Incorporated, 368 Eglinton Avenue West, Harold Herzog of Downsview, Co-Director of House of Computers Incorporated and Stephen Weisbrod and Harold Taylor of Toronto, Co-Directors of Syrograph International Incorporated at the time of the alleged offence.

All are charged with Conspiracy to Commit Fraud. It is alleged that Mark Herzog and his company, Questar International Incorporated, conspired with Stephen Weisbrod, Harold Taylor and Syrograph International Incorporated during July and August 1984 to duplicate in its entirety the Flight Simulator II game.

Mark Herzog, Harold Herzog and House of Computers Incorporated are also charged with Conspiracy to Commit Fraud in relation to the sale and distribution of the 6,000 counterfeit Flight Simulator II across Canada and into the northern United States between August 1984 and February 1985. (End of news release)

The software wasn't pirated, per se, but duplicated — disk, label, warranty, serial number, documentation, packaging and wrapping. A spelling mistake within the documention tipped investigators off; the manual was from the software's original release, and the serial numbers didn't pertain to that release. Retail outlets found carrying the counterfeits by Sublogic's president had their stock replaced by authentic packages, according to Mr. Hampson. Reports that duplicate serial numbers have appeared in Batteries Included's *PaperClip* word processing package have raised suspicion that it, too, was counterfeited.

Tips from the Canadian Computer Dealer Association lead to the September 1984 raid of a software evaluation club in Markham, with 32 cartons of pirated software confiscated, and the confiscation of 6,000 programs from a Southern Ontario university professor.

"The CCDA has instigated more than 20 police investigations regarding software piracy in Canada." says Hampson.

May Events

TORONTO, ONTARIO — May, as a rule, is full of events. For one thing, you'll eventually get your tax refund back. On a lesser strained note, there are two events of interest happening this month.

Computer Fair, presented by *Hunter Nichols Incorporated*, kicks off this year from Wednesday, May 8 to Saturday, May 11. The Fair has moved from its old location at the International Centre, and will be opening at the more centrally-located Metro Toronto Convention Centre. Since Computer Fair's 1982 inception, it has rapidly grown to become one of the largest consumer orientated all-microcomputer exhibitions in the world. Last year, over 46,000 people caught the show.

The Metro Toronto Convention Centre is located at 255 Front Street West in downtown Toronto, Ontario.

The fourth annual *TPUG Conference* will be held in Toronto on Saturday, May 25 and Sunday, May 26. With a growing membership of over 15,000 Commodore users, the *Toronto Pet User's Group* is the world's largest independent Commodore user's group.

Speakers are scheduled for both days, covering topics for both beginners and experts. The club library of over 5,000 public domain programs will be available at $4.00 per disk, and exhibitors of all varieties of wares will be at hand.

The conference will be located at 252 Bloor Street West (second floor) in Toronto.

Bookware Wars

BERKELEY, CALIFORNIA — Adam Osborne's in the news again, charging that "... the corporate office of ComputerLand suppresses sales of new, high-quality software products simply because the prices are too low."

What Osborne, now the president of *Paperback Software International*, is referring to is ComputerLand's recent decision not to carry his product, and an alleged statement from ComputerLand's Software Program Manager Linda Bennett stating that "... suggested retail prices (of $19.95 to $69.95) are too low to fit into ComputerLand's current marketing plan."

Osborne decried the policy as shortsighted and is urging consumers to "... resist such practices." He states that "... the big retail chains won't offer reasonably priced products until their customers demand them by rebelling against $500 word-processing programs and similar, ludicrously priced software."

Moorshead Publications of Toronto has purchased **Pets Magazine** from its publishers, Pets Magazine Limited. This now gives The Moorshead Group a total of five publications. The first issue under The Moorshead Group will be distributed before the end of April and will have a circulation of 100,000 distributed principally at veterinarian clinics across Canada.

Next Month In Computing Now!

Macintosh Special

Well, we checked out PC's in this edition . . . it only seems fair.

A few months ago there wasn't any software to speak of for the Macintosh . . . now it's worming its way out of every fruit in creation. In the June edition of Computing Now! we'll be looking at a host of new applications for the ubiquitous Mac.

We'll also be having a peer at some of the public domain software that can be had for the Mac . . . you probably didn't even know it existed.

Finally, we'll be looking at programming the thing. The Macintosh is one of the few computers which didn't come with any programming languages or tools . . . and they haven't exactly been leaping from the doors of third party suppliers since. We'll have a dig at what there is and what can be done with it.

You won't want to MacMiss it.

Sloth Ranching

In the next edition we'll look at the first steps in building a sloth of your own. Of course you need a sloth . . . you just aren't aware of the awesome shrieking vacuum in your existance which only this existential fragment of technology can fill. The Sloth IV computer is a small Z80 based processor board which will teach you about board level computer hardware . . . moderate yawn . . . and give you a powerful dedicated controller for all manner of applications . . . resounding cheers. Unlike the approximately six quadzillion other single board systems now extant upon the planet, this little zoot has been expressly designed with parts you can actually get in quantities of one.

Bank Machines

There must be computers in those little electronic tellers . . . instinct would tell you this, if not the little IBM logo on the front. Yes, they could be running off electronic typewriters but it does seem unlikely. In the next Computing Now! we'll be going inside the workings of a bank machine to see how they operate and how they were set up. It's a lot more involved than one might think.

The aforementioned features are in an advanced state of preparation and we really do plan to get them together for the next edition of Computing Now!. However, we reserve the right to change the final editorial lineup due to circumstances beyond our control and disasters beyond our imagination. Mostly the latter. Thank you for reading this disclaimer . . . we now return to the magazine already in progress.

continued on page 68

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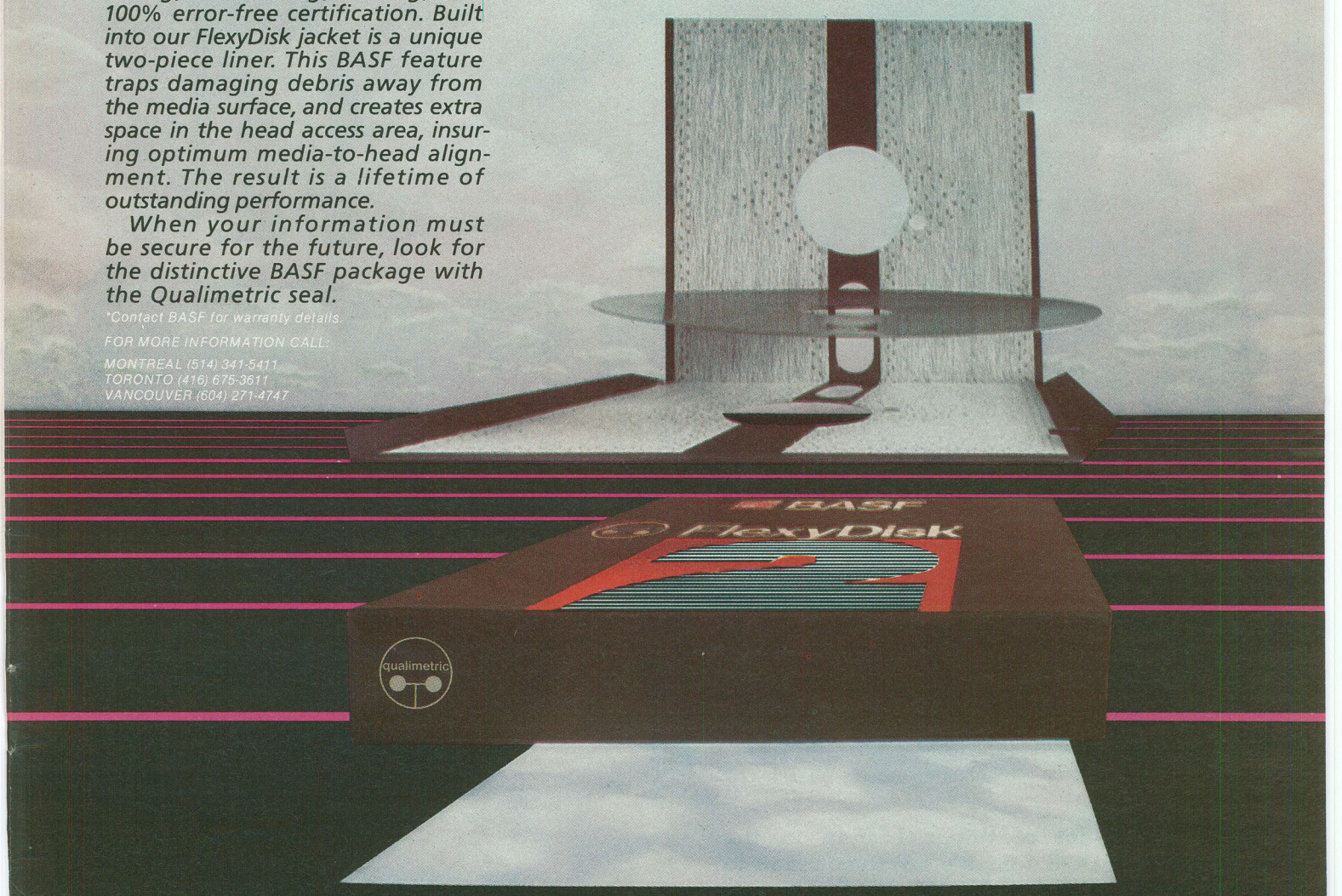

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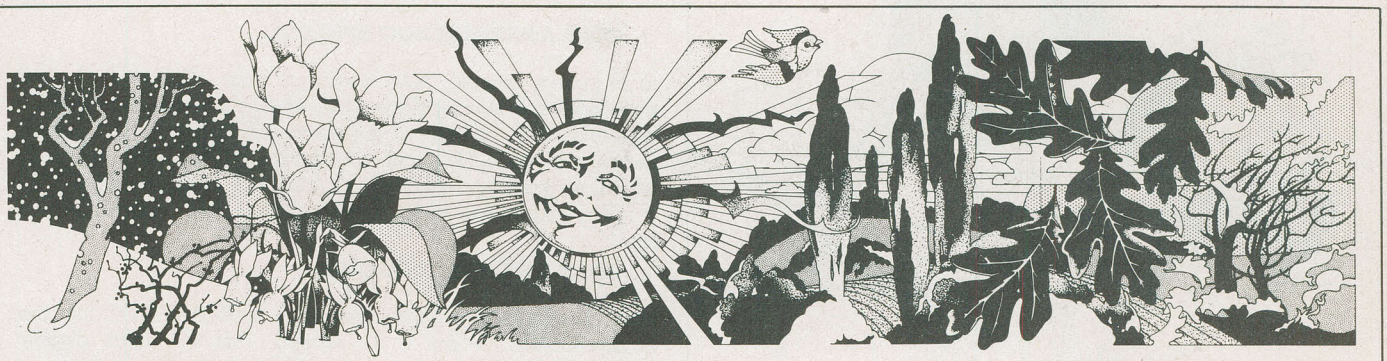
Boxes of Blues

There are a lot of things hidden in the catacombs of DOS 2.0... it's not uncommon to stumble across something that will give you new power in its use. It sounds like an adventure game. Here are a few swords and magic wands to try.

by Steve Rimmer



Instant Rainbow

If you have a colour monitor atop your PC you'll no doubt have noted that software can display information in colour... even though DOS seems bent on making you look at system level things in black and white. If you work at the DOS level a lot your eyes would probably be finer servants of your soul if you could peer at green letters, or amber letters... or, if you've been into the mushrooms again, perhaps cyan letters on a purple background.

There are utilities, like the one which was presented a few issues back in Computing Now!, which will change the colour of the screen. However, these have several drawbacks. To begin with, you have to be into assembly language programming to handle their creation. Secondly, there are some programs which, upon completion, will return the screen to its native white on black... it's so low tech.

There is an alternate way around the colour hassle, one which is so obscure as to be almost non–existent. It has to do with one of those mysterious DOS 2.0 files, called ANSI.SYS.

Among other things, when ANSI.SYS is in place... we'll get to that... it allows DOS to interpret certain sequences of characters printed to the screen in special ways. These sequences are always preceded by the escape character and, as such, are not surprisingly referred to as *escape sequences*.

You'll have already noted that you can't enter an escape character from the command line, as this is also the character which DOS uses to mean "I didn't like that line either... here, why don't you retype it." However, with sufficiently tricky manipulation we can get those escape sequences happening.

The easiest way around this is to create a batch file with a REM command... which doesn't do anything... followed by the escape sequences we want to use. The REM and everything following it will be printed when the file is executed, ANSI.SYS will interpret the sequence and whatever we want to happen will do so.

The BASIC program here is a convenient way of creating an AUTOEXEC.BAT file to set up the screen for different colours. It actually appends the REM statement to an existing AUTOEXEC file if one exists, so if you run this several times you'll want to kill the old file prior to each iteration.

There is, needless to say, an escape sequence which sets the screen colour. It consists of an escape, a left square bracket, a number to represent the foreground colour, a colon, a number to represent the background colour, a lower case *m* and a right square bracket. This program also sends the escape sequence for clearing the screen as well, as the display looks a bit gross for twenty–four lines unless one does.

This program also takes care of installing ANSI.SYS. This is done by creating a file called CONFIG.SYS with the line

DEVICE = ANSI.SYS

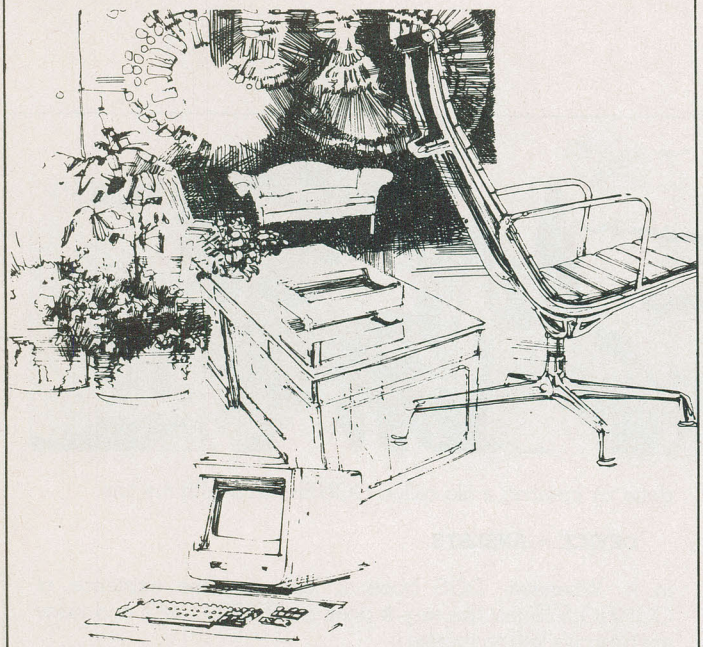
in it. Whenever DOS boots it looks for the existence of CONFIG.SYS just the way it does AUTOEXEC.BAT and loads anything it's told to therein.

If you already have a CONFIG.SYS file with some drivers in it this program will add ANSI.SYS to it... although, again, beware... it'll add another ANSI.SYS each time it's run.

```
10 '.....................................
20 '
30 'Quick 'n' Nasty
40 ' IBM PC Screen Attribute Editor
50 ' Copyright (c) 1985 Steve Rimmer
60 '
70 ' .....................................
80 '
90 CLS : KEY OFF
100 RESTORE : F = 0
110 PRINT "The available foreground attributes are:"
120 PRINT "BOLD       REVERSE    BLACK      RED"
130 PRINT  "GREEN     YELLOW     BLUE       MAGENTA"
140 PRINT "CYAN       WHITE"
150 INPUT "What'll it be";FORE$
160 FOR X=1 TO 10 : READ A$,B$
170 IF FORE$ = A$ THEN F = VAL(B$)
180 NEXT X
190 IF F=0 THEN 90
200 CLS
210 RESTORE : B = 0
220 PRINT "The available background attributes are: "
230 PRINT "BLACK      RED        GREEN      YELLOW"
240 PRINT "BLUE       MAGENTA    CYAN       WHITE"
250 INPUT "What'll it be";BACK$
260 FOR X = 1 TO 10 : READ A$,B$ : NEXT X
270 FOR X = 1 TO 8 : READ A$,B$
280 IF BACK$ = A$ THEN B = VAL(B$)
290 NEXT X
300 IF B = 0 THEN 200
310 OPEN "AUTOEXEC.BAT" FOR APPEND AS #1
320 PRINT #1,"REM " CHR$(27) "["
          RIGHT$(STR$(F),LEN(STR$(F))-1) ";"
RIGHT$(STR$(B),LEN(STR$(B))-1) "m]" CHR$(27) "[2]""
330 CLOSE 1
340 OPEN "CONFIG.SYS" FOR APPEND AS #1
350 PRINT #1,"DEVICE = ANSI.SYS"
360 CLOSE 1
370 END
380 DATA "BOLD", "1","REVERSE","7","BLACK","30","RED",31",
          "GREEN","32"
390 DATA "YELLOW", "33", "BLUE", "24", "MAGENTA", "35",
          "CYAN", "36",  "WHITE", "37"
400 DATA "BLACK", "40", "RED", "41", "GREEN", "42",
          "YELLOW", "43", "BLUE" , '44"
410 DATA "MAGENTA", "45", "CYAN", "46", "WHITE", "47"
```

Boxes of Blues

Across The Room



One of the mysterious, oft ignored... and probably rightly so... facilities of DOS is its potential for regarding things other than its screen and keyboard as it console device. For example, it can use the printer... not a very good choice... or, more practically, the serial port.

It's probably worth noting that under DOS 2.0 communications between the processor and its peripherals is handled in a quasi-UNIX style, in which all of the peripherals are given *device names*. This means, for example, that the console is called *CON:*, the printer *LPT1:* and so on.

The disk drive, and files therein, are also devices. If you say

COPY A:WOMBAT.DOC B:PIG.DOC

at a party people will laugh at you. However, a few knowledgeable souls will know that what you had in mind was the directing of the contents of the device WOMBAT.DOC... which happens to be a file... into the device PIG.DOC on drive B, which, as things have turned out, also happens to be a file.

You might have said... to the equal mirth of those within earshot...

COPY A:WOMBAT.DOC CON:

which means to direct the contents of WOMBAT.DOC into the device CON:... which is the screen. This will, then, display WOMBAT.DOC on the glass. The TYPE command is easier.

Now, let's say that we could find a way to make CON: stop being the keyboard and screen and start being the serial port. Everything which thinks it's sending data to the screen and accepting keystrokes from the keyboard would really be doing so with a terminal connected through a cable... or even a modem... some distance away.

There is a way to do this... in fact, it's idiotically simple. Let's assume that you have a terminal... or another computer pretending to be a terminal... connected to the COM1: serial port. You would set the protocol of the port with MODE, as in

which would set the port up for three hundred baud communications. Next you would issue the highly mystical command

CTTY COM1

Note that, for reasons mere mortals aren't meant to fathom, there is no colon after the device name when you use CTTY.

If you have the aforementioned terminal on line you'll note that the screen of your PC will go dead and the DOS prompt will turn up on the remote tube. If you type DIR on the terminal you should see the directory.

There are several catches to using CTTY this way... all of which are large enough to make it useless for many applications. To begin with, IBM's programming guide says that it would be extremely good if everyone did all their I/O and character handling through the proper channels... but even IBM doesn't adhere to this particularly well. The system's internal facilities are slow so, for example, programs like WordStar, which access the screen a lot, use their own. Redirecting the console with CTTY doesn't redirect any of the nine zillion forms of weird screen accessing that people have dreamed up over the years.

As such, programs like WordStar... and BASIC... aren't much use remotely. In fact, in order to be able to use CTTY you pretty well have to write code with it in mind. However, it's fun to play with and occasionally mildly useful.

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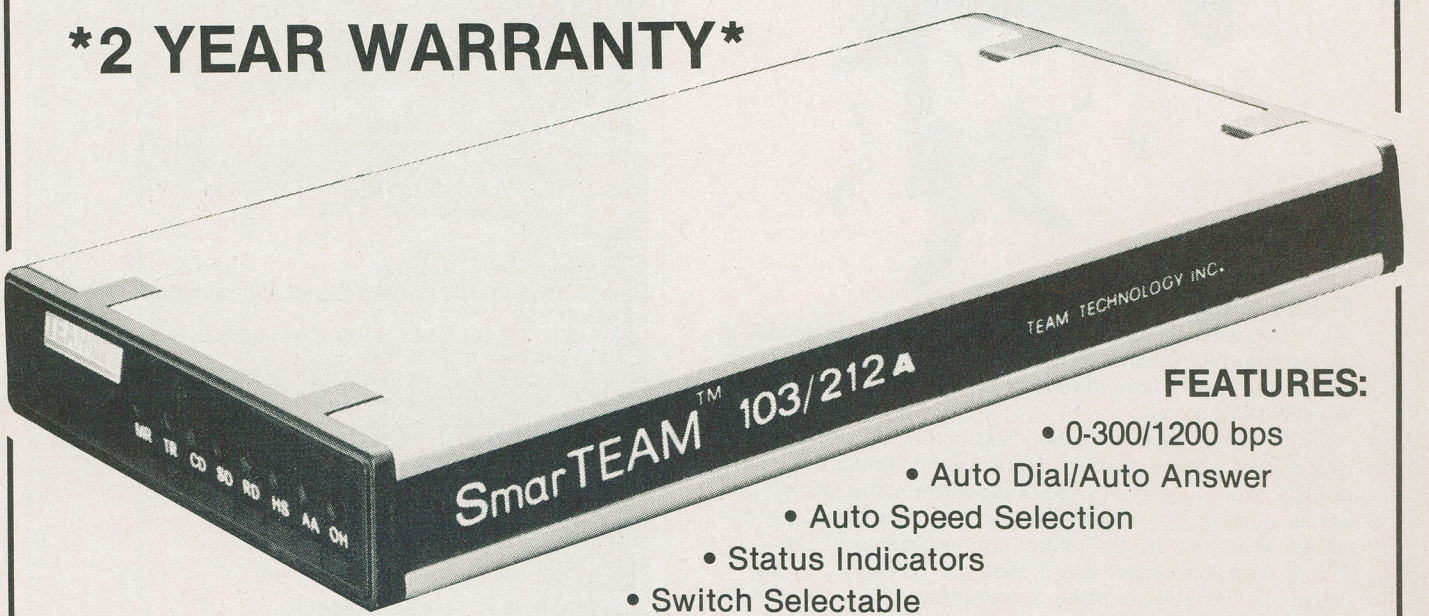

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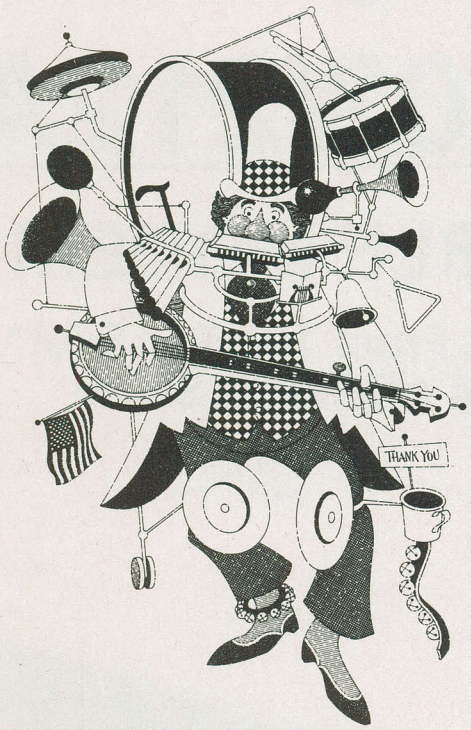


Funky Blues

A lot of operating systems allow you to have strings imbedded in the keyboard's function keys. This means that one might, for example, zap the F1 key instead of typing DIR, F10 to invoke WordStar and so on.

DOS doesn't seem to do this... and, in fact, it doesn't ordinarily. However, you can make it support function strings if you hook in ANSI.SYS... as we've looked at elsewhere in this article... and lay still more escape sequences on it. It's pretty weird, and the escape sequences are the hairiest ones of the bunch. However, with everything together they'll allow you to define any key to output any character or string of characters.

Rather than having to try to create the sequences by hand, you might want to use the following bit of BASIC. It allows you to edit a file called FUNKY.DAT, which holds the escape sequences. It also creates a file called FUNKY.BAT, which holds the lines

```
CTTY NUL
TYPE FUNKY.DAT
CTTY CON
```

With everything in place, having run the program you'll be able to include the command FUNKY in your AUTOEXEC file to automatically redefine the function keys when the system boots. The CTTY commands just makes the screen a bit neater, as it does all the printing to the device NUL... which doesn't strictly speaking exist... rather than to your tube.

Unlike the other escape sequences we've talked about in this feature, this group is held in a file and TYPE'd rather than being stashed after REM commands in a batch file. This allows them to be easily edited by the program... it'll suck FUNKY.DAT back into itself on subsequent runnings and change the existing definitions.

This arrangement also allows for not defining those keys you'd rather leave as they are. You probably will want to leave the F3 key alone, for example... in which case you can just not define a string for it.

The program allows for a trailing carriage return at the end of each line. You can put this in if you want the key in question to issue a complete command... such as DIR with no file specification... or omit it for commands that will require some extra stuff, like TYPE.

Having run... and saved... the program exit to DOS and type FUNKY. The function keys you've defined will spew out what you've told them to do.

```
10 ' ..................................
20 '
30 ' Quick 'n' Nasty
40 ' IBM PC Function Key Editor
50 ' Copyright (c) 1985 Steve Rimmer
60 '
70 ' ..................................
80 '
90 KEY OFF : CLS : CLOSE
100 ON ERROR GOTO 490
110 OPEN "I", #1,"FUNKY.DAT"
120 FOR X = 1 TO 10
130 LINE INPUT #1,FUNKY$ : FKEY$(X) = FUNKY$
140 NEXT X
150 CLOSE
160 ON ERROR GOTO 0
170 'DISPLAY THE ASSIGNMENTS
180 CLS : PRINT "Function key assignments"
190 FOR X = 1 TO 10
200 IF FKEY$(X) = "" THEN 230
210 T = INSTR(FKEY$(X),CHR$(34))+1 : FSTR$(X) =
      MID$(FKEY$(X),T,INSTR(T,FKEY$(X),CHR$(34))-T)
220 IF VAL(RIGHT$(FKEY$(X),3)) = 13 THEN RET$(X)
      = "13" ELSE RET$(X) = "32"
230 NEXT X
240 FOR X = 1 TO 10
250 PRINT "F" X FSTR$(X);
260 IF RET$(X) = "13" THEN PRINT CHR$(27) ELSE PRINT
270 NEXT X
280 INPUT "Enter a key number or return to quit: ",SEL$
290 IF SEL$ = "" THEN 370
300 IF VAL(SEL$) 1 OR VAL(SEL$)  10 THEN 170
310 INPUT "Enter the key string: ",FSTR$(VAL(SEL$))
320 PRINT "Trailing carriage return? (Y or N) ";
330 A$ = INPUT$(1) : IF INSTR("YyNn",A$) = 0 THEN 330
340 IF INSTR("Yy",A$)  0 THEN RET$(VAL(SEL$)) =
      "13" ELSE RET$(VAL(SEL$)) = "32"
350 GOSUB 560
360 GOTO 170
370 'WRITE OUTPUT FILE
380 OPEN "O",#1,"FUNKY.DAT"
390 FOR X = 1 TO 10
400 IF FSTR$(X)  " " THEN PRINT #1,
    FKEY$(X) ELSE PRINT #1,CHR$(13)
410 NEXT X
420 CLOSE 1
430 OPEN "O",#1,"FUNKY.BAT"
440 PRINT #1,"CTTY NUL"
450 PRINT #1,"TYPE FUNKY.DAT"
460 PRINT #1,"CTTY CON"
470 CLOSE
480 END
490 'ERROR HANDLER
500 FOR X = 1 TO 10
510 FSTR$(X) = " "
520 NEXT X
530 GOSUB 560
540 GOSUB 610
550 RESUME 90
560 'CREATE FKEY STRINGS
570 FOR X = 1 TO 10
580   FKEY$(X) = CHR$(27) + "[0;" +
    RIGHT$(STR$(58+X),2) + ";" +
    CHR$(34) + FSTR$(X) + CHR$(34)
    + ";" + RET$(X) + "p"
590 NEXT X
600 RETURN
610 'WRITE THE FILE
620 CLOSE
630 OPEN "O", #1,"FUNKY.DAT"
640 FOR X = 1 TO 10
650 PRINT #1,FKEY$(X)
660 NEXT X
670 CLOSE
680 RETURN
```

A Short Pipe

You may have heard about the pipes that DOS 2.0 supports but, unless you're a plumber, they might not have held much interest for you.

A complete discussion of pipes and I/O redirection is quite the undertaking and, not having a coffin handy, I think I'll leave it for another article. However, this is a useful example of a quick and nasty pipe that has an immediate practical use.

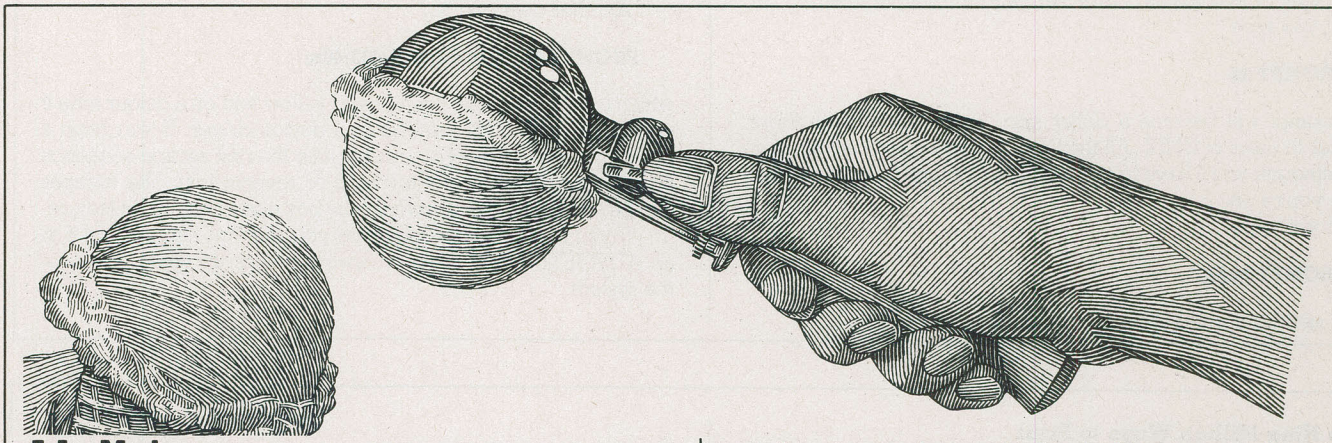
Create a batch file called LIST.BAT which contains the line TYPE %1 ¦ MORE. The easiest way to do this is to type

```
COPY CON: LIST.BAT
TYPE %1 ¦ MORE
```

and then hit control Z. The little vertical line can be found just above the *alt* key on your keyboard.

If you were now to type LIST WOMBAT.DOC the file WOMBAT.DOC would be displayed on your screen... with a pause every twenty-four lines. It's a bit time consuming on a floppy... and the piping process needs a bit of disk overhead... but it's just about as fast as using TYPE on a hard drive.

What we've done here has been to send the output of TYPE into MORE rather than onto the screen. MORE is a program which prints whatever it's given one screen full at a time.



A La Mode

The DOS MODE command can be extremely useful... it sets the parameters of the system's peripherals... or most of 'em, anyway. For the most part, it's concerned with character oriented things, like the printer, the screen and the console.

The parallel printer port has a number of things happening with it. The most useful is the number of characters it will send to the printer before it decides that there had better be a carriage return, like it or not. If you have a one hundred and thirty-two column printer attached to port LPT1: you would use mode to tell DOS about it, as in

```
MODE LPT1:,132,P
```

The final P is optional. It tells DOS to keep trying to print characters if it gets a time out error, rather than telling you about the error. It's useful if you have a particularly obstinate... or cheap... printer.

The serial ports, COM1 and COM2, are a bit tricky in that they can be either modem ports or serial printer ports. They should behave the same either way, but, of course, they don't. MODE lets you tell DOS what's connected.

This line

```
MODE COM1:1200,E,7,1,P
```

sets the printer up for a twelve hundred baud printer. If you omit the P it'll be a twelve hundred baud modem. This assumes that one has the appropriate cables either way.

If you have a program which wants to send data to a parallel port... LPT1:, for example... while, in fact, you have a serial printer, say on COM1:... you can use MODE to redirect the data to where it'll do some good. First off, set up the serial port with MODE... like we did a second ago... and then do

```
MODE LPT1:=COM1:
```

Thereafter, everything will tool out to the serial printer.

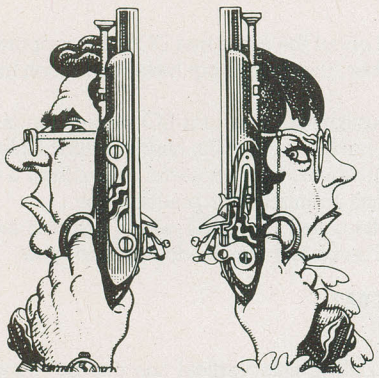
Finally, MODE is useful in handling the screen. Typing MODE followed by either "80" or "40" will set the screen to the applicable width. If you stick "BW" or "CO" in front of one of these numbers you'll also get to decide whether the tube will be black and white or colour.

You can also use MODE to take care of funky monitors and television sets that lop off part of your display. Type

```
MODE 80,R
```

to shift the display to the right. Using L instead of R, not surprisingly, shifts it to the left. It you append ",T" to the line you'll get a test pattern to help you figure out how much shifting your tube requires.

Snuff the Arrow



When DOS boots up under normal circumstances it shows you

A►

which tells you that you're on drive A: and that the guy who wrote the system had previously been into CP/M... which uses the same prompt. You might fancy a different prompt.

There is a command... called PROMPT, of course... which allows you to change the DOS 2.0 prompt to anything you feel like having it be. It's extremely flexible and, while this may seem like finessing the situation a bit, it's an interesting play.

To begin with, the prompt need not be just a few characters. It can be quite large if you want it to be so, and it can display quite a bit of information. Let's start with the simple trolls.

If you type

PROMPT $$

the prompt will become a dollar sign... something much more familiar to users of UNIX. All the DOS commands will act normally... although you'll have to use the CD command to find out what drive you're on.

If you type

PROMPT ng

you'll get the normal DOS prompt back.

If you type PROMPT followed by any text the text will become the prompt. So,

PROMPT Do something

will have the predictable result.

The exception to all this lies in dollar signs. The syntax of PROMPT thinks that dollar signs are something special. Some letters, when preceded by a dollar sign, take on special meanings. For example, putting *$t* in a prompt string will insert the current time.

The available dollar sign commands are

$$	**Shows a dollar sign**	**$g**	**Shows a right arrow**
$t	**Shows the time**	**$l**	**Shows a left arrow**
$d	**Shows the date**	**$b**	**Shows a vertical line**
$p	**Shows the current directory**	**$s**	**Shows a leading space**
$v	**Shows the version number**	**$h**	**Backspaces**
$n	**Shows the current drive**	**$e**	**Does an escape**

in addition to this, a dollar sign followed by an underscore does a carriage return and a line feed.

Here are a couple of fairly sophisticated prompts

PROMPT [thhh drive $n]

which shows the current time and drive. The three *$h* sequences backspace over the hundredths of a second, which are a bit superfluous. A reasonable number of backspaces in a prompt sequence is quick enough to give the impression of whatever is being backspaced over not being there at all.

Another neat one is

PROMPT $e[32;40m$nge[33;40m

which displays a green prompt and yellow text on a colour tube if you have ANSI.SYS installed as a device driver. If you have a black and white tube you can replace the first escape sequence with the appropriate one for bold or reverse text. The escapes can be found in the *Instant Rainbow* box elsewhere in this feature.

If you get a prompt sequence you like you can include it in an AUTOEXEC.BAT file so it always comes up when you boot the system.

The Nine Million Ways to Print

Getting hard copy out of a PC is reasonably easy... if you can decide how you want to do it. There are rather a lot of options.

The simplest way to print something at the DOS level is type TYPE it and hit a control P just before you hit return. This will echo everything on the screen out to the printer. It will also echo the prompt character when the file is done... a drag, this.

Hitting control PrtSc* will also echo things to the printer... it's equivalent to control P.

There's a really decent command called PRINT. If you type

PRINT WOMBAT.DOC

assuming that you have a file handy called WOMBAT.DOC... the file will be sent to the printer. However, you will immediately be returned to the DOS prompt, ready to do something else. Print is a print *spooler*. Having been invoked, it will print the file of your dreams on the printer in the background while you're doing something else.

The spooler is fairly clever, as it largely runs in the processor's idle time, such as when the PC is waiting for keyboard input. It may not print your file as fast as simply echoing it to the screen would, but it also won't slow down your foreground tasks too much.

The spooler can be invoked a second time while it's still printing the first file. The second file will be queued up and printed when the first one is done. In fact, you can queue up to ten files.

If you type PRINT with no file name it'll tell you what's in the queue.

If you don't have PRINT handy and don't want to just echo your file to the printer you can use a lesser known variation of COPY. Type

COPY WOMBAT.DOC LPT1:

This is telling DOS to copy your file to the printer's logical device.

The shift PrtSc* key will dump the contents of the screen to the printer... that is, it will bop whatever characters that are crawling around the tube to the printer at the instant the key is hit. When the screen has been dumped the computer will return control to whatever was happening when you hit the key.

The PrtSc* screen dump only works for text screens, of course. However, you can set it up to be a graphics dump instead by running GRAPHICS from DOS before you hit the PrtSc* key. Graphics dumps are somewhat slow.

The MODE command can be extremely useful in making your printer behave. You might want to check out the appropriate box elsewhere in this feature.

Actually, I lied... there aren't nine million ways to print. However, the permutations can get a bit dazzling at times. **CN!**

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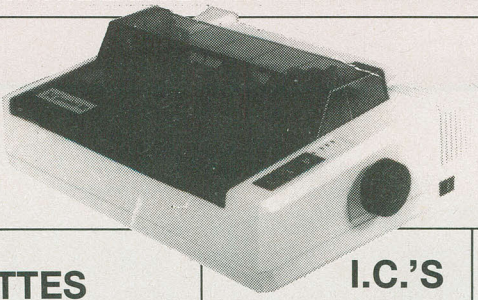

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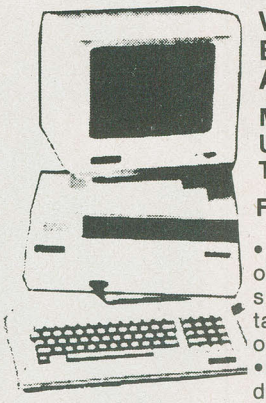

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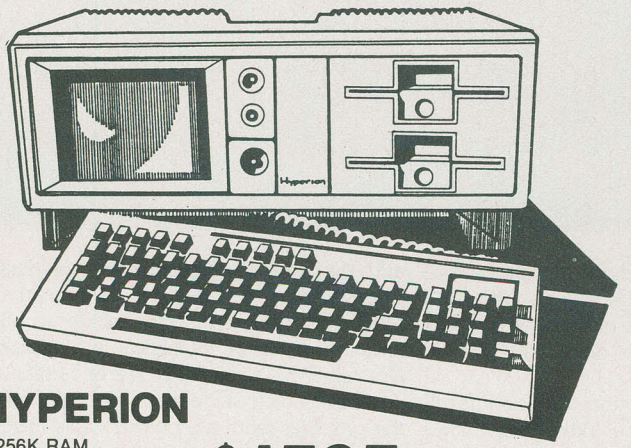

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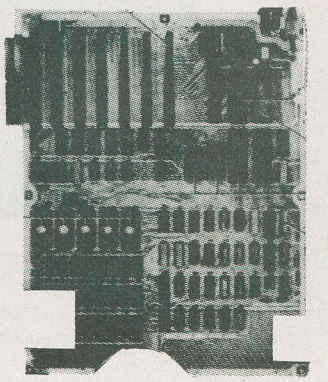

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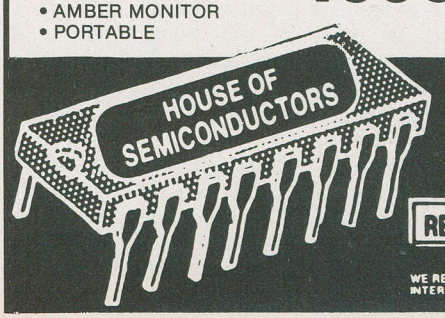

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Pixel Productions

Telidon... it's not dead, but merely sleeping. While it dozes fitfully, small green eyed trolls lash its dormant form to the ground with countless lines, meaning to harness its awesome might to their own ends. Here is the tale of one of them.

by Frank Lenk

You may remember Telidon... and how it was supposed to take over the world and didn't.

Well maybe it did, only nobody noticed.

Actually, Telidon is alive and well and living as NAPLPS... the North American Presentation Level Protocol Syntax. It could be the acronym itself that killed off public attention. "Can you say Nap Lips?" Still, even under that appallingly unpronounceable title the old Telidon standard has somehow continued to flourish... in much the same way that the woodland mushroom will flourish unseen and forgotten under a carpet of leaves... and then suddenly spring up all over the place.

It could be that Telidon is similarly going through a dormant phase, just getting ready to spring up all over the place.

The trick with NAPLPS is that although it has been well supported in theory, it has rarely been put into commercial practice. There is, of course, Infomart, which is one of the few Canadian enterprises taking advantage of the potential of NAPLPS graphics. Infomart runs several graphic database services, including the Tele Guide terminals scattered around Toronto and the agriculturally oriented home service Grassroots.

It turns out that there is at least one other company banking its fortunes on the future of NAPLPS. Toronto's Pixel Productions has taken an approach that is drastically different from Infomart's database activity. In fact, Pixel is certainly the first company in Canada... and perhaps anywhere... to define itself as a NAPLPS production house.

A Big Production

Toronto is dotted by myriad film and video production houses. Most of these thriving little enterprises are never heard of unless you're an assiduous reader of closing credits on obscure TV productions. Occasionally one of them will suddenly win an Oscar in some peculiar category and enjoy a brief moment in the sun before once more fading into happy oblivion.

This poetic description fits Pixel Productions quite well. The interesting thing about Pixel, in fact, is that it's the creation of two people, Michel Gabereau and Rachael McAfee, with strong backgrounds in video and none in computing at all.

These folks moved into Telidon directly from video, working with the BellVista trial program that was run by Bell Canada and the federal Department of Communications. Bell put a bunch of black box decoders in homes and started up a graphic database system complete with a yellow pages style printed directory. The intention was to attract big business clients like the Bay, Eatons and the Royal Bank, with Bell eventually cleaning up on line charges. Gabereau and McAfee got involved with the startup page creation program, which made available a Norpak IPS II terminal at the Bell office.

Using their access to this equipment, the graphics team did considerable custom artwork, including the now ledgendary Zazie... the electronic doll. Zazie became one of the most popular items on BellVista, and is presently still doing well on Grassroots. Gabereau and McAfee actually claim responsibility for bringing in the first paying work for BellVista, an ad for Thomas Cook travel.

The same team also got into the early days of the Tele Guide project, originally operated by the Ontario government and Infomart and distributed by Infomart, the Toronto Star and Key Publishing. While

most of the attention was focussed on use of Telidon as a medium for page oriented electronic publishing, Gabereau and McAfee were mulling over the possibility of using the system in a more cinematic way for animation or other audio visual types of applications.

Even as the early trial projects were winding down, the pair were drawing together a consortium of people interested in the possibility of forming a genuine Telidon production house. Pixel Productions was the eventual result, founded in October of 1982.

According to Rachael McAfee, the Pixel team was sorry to see the end of the various Telidon trials, even though it had some serious reservations about the original page creation approach. From the first Pixel was based on the notion of a "total production look". This partly meant moving away from online database systems in favor of stand alone applications. It also meant a greater use of the complete resources of the microcomputer... including BASIC programming... to manipulate the basic NAPLPS files.

Michel Gabereau has gradually picked up a reasonably nitty gritty knowledge in all phases of computing, including the dreaded BASIC.

Pixel Productions has also benefitted from the expertise of one Douglas Young. An ex-meteorologist living in the Orangeville, Ontario, Young has become a successful freelance programmer... spending part of his time putting the final polish on programs for Pixel.

The essential philosophy at Pixel is to always put the art first, and use only as much computing technique as it takes to make the desired visuals happen. Thus Pixel actually has much more need for freelance artists than for programmers. The process usually involves first getting an artist to turn out some hot images, and then having Gabereau, Young et al do a bit of fooling around with BASIC to produce some colour shifts, or add some motion to the original graphic. Since NAPLPS stores images in very simple sequences of bytes, the screen files are ideally suited to poking around in BASIC.

The last step is organization of the individual animated sequences into a menu driven or slide show type of structure for eventual presentation.

Shooting the Works

I first came across Pixel Productions just as they happened to be doing a bit of trans-Atlantic transmitting. It seems that contacts established at the VidCom show in Cannes last year led to a link up between Pixel and the ParisGraph show this March. Pixel installed one of its NAPLPS equipped PCs at the Harbourfront Computer Centre in Toronto and proceeded to demonstrate its ability to send complete images both ways across the ocean at twelve hundred baud over normal telephone lines. This went over very well with the crowd at Harbourfront, although it's hard to say how the estimated twenty thousand daily visitors in Paris reacted.

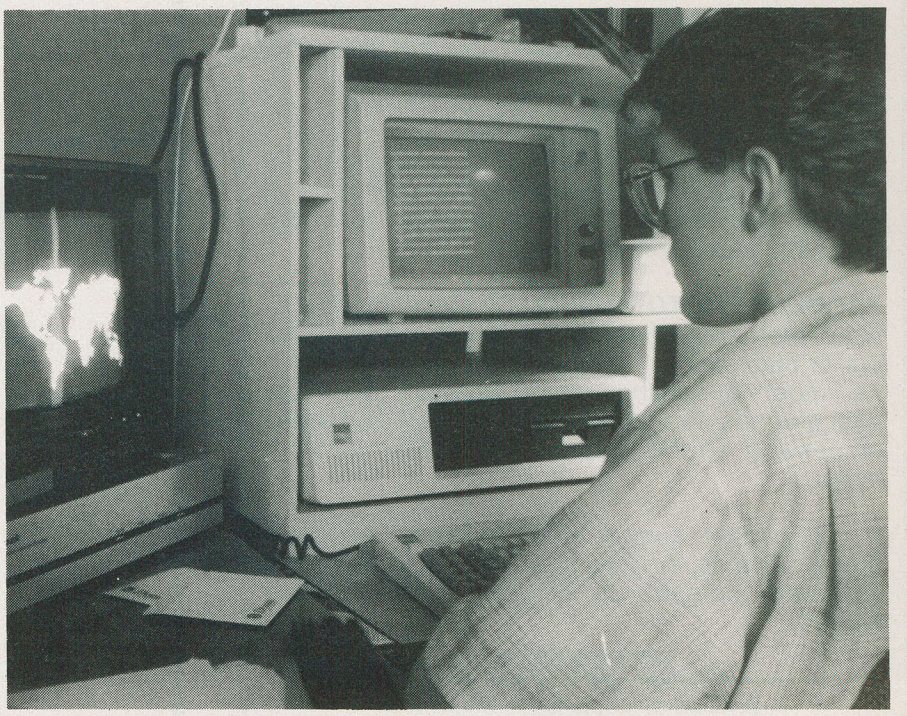
Pixel Productions itself is pally instantaneous graphic depiction of riding by riding returns. The two micros were hooked to the CTV mainframe in Montreal. One system would be online at any time, displaying bar charts, maps or other visuals. The second system would be busy updating the next riding to be reported. The two systems would spell each other on a cycle as short as seven seconds, closely following what the announcers were covering. The whole operation was considered a rousing success.

One of the most unusual displays mounted by Pixel is a video lightshow at Toronto's Copa bar. Pixel has assembled graphics to suit the dance music as well as a series of ads for the house specialty drinks. A single PC outputs through a video booth where a video jockey exercises some creative control. The display is via forty standard monitors and two Aquastar twenty foot screens.

The bread and butter work is not quite this exciting. However, some institutional presentations are fairly impressive in their own right. Pixel has done a number of film strip type instructional pieces for clients such as the Canadian Centre for Occupational Health and Safety and the Canadian Heart Foundation.

Although these creations are a lot closer to the sort of Telidon we're used to seeing, they still do a pretty good job of demonstrating the amount of movement and real useful information that can be delivered using the NAPLPS protocol. For instance, a Health and Safety piece on construction safety uses clear diagrammatic pictures with text overlays and simple animations to explain proper trench digging practices. It's incredible how quickly you soak up information when it's presented this way... even if you have no particular reason to be interested in the subject matter.

At the far end, Pixel sees no reason why NAPLPS can't be used to do full animation. The company's most recent success in this direction was the production of some explanatory animation sequences for the CBC series *Planet for the Taking*.



Pixel's main page-creation terminal bears close resemblance to a certain well-known micro . . .

Pixel Productions

1A Poke in the Guts

One might suppose that managing all this electronic Disneyana needs some pretty heavy hardware. This is not so. Although Pixel still owns one of the original Norpak IPS II information provider systems, this desk size system is now rarely used. Most of the serious work gets done on three simple systems; an IBM PC, a PC portable, and... of all things... a PCjr.

As the Pixel people are swift to point out, Telidon is finally coming home. New graphics hardware and software for the IBM and its numerous offspring are putting serious NAPLPS within the reach of even the casual home computist.

Having developed cordial relations with IBM, Pixel has for some time been working with a beta test version of the new IBM NAPLPS software converter. Since the commercial edition is still a ways off, details about its capabilities are a bit scanty. However, Pixel does speak glowingly of some of the features of this software, including its ability to interface to most programming languages, its built in file management database and its built in communications support. The latter function will even allow instant menu access to a half dozen logon macros. Its is expected to cost about three hundred and fifty dollars.

What with the limited colour graphics available on a stock PC, Pixel has also moved on to a new video adapter. The RealColour board... supplied by Micro Design Systems... is one of those specifically supported by the new IBM software. The current version of this board offers sixteen colours chosen from a palette of five hundred and twelve in three twenty by two hundred pixel resolution. Apparently it also provides some nice conveniences such as colour indirection, which lets any screen colour be instantly changed... the sort of thing normally found on much more expensive... or much cheaper... machines than the stodgy old PC.

Pixel Productions is looking forward to some even more powerful successors to this early RealColour adaptor. A new version should soon replace the existing board, offering a palette of over four thousand colours. This board should sell for about seven hundred dollars in Canada. A high end board should eventually be added to the RealColour line, providing up to two million colours with one thousand by six hundred pixel resolution and even allowing videotape images to be incorporated as one of the colours.

Aside from a good display interface... and a decent colour monitor... the requirements for full fledged NAPLPS production are not onerous. All the images are defined in terms of primitives... lines, rectangles, arcs and other geometric components. This approach is extremely space efficient. For example, any rectangle is specified by a mere nine bytes; one to select the type of shape, two for the colour and six to pin down the screen co-ordinates. A big NAPLPS page would hardly account for two kilobytes of storage and most run no more than five or six hundred bytes. Even the IBM software decoder will run as a bare bones configuration in about seventy-five kilobytes... minus communications and the other frills.

Stand alone slide show presentations from Pixel Productions are configured to run from a RAM disk, speeding the transitions between frames. A quarter megabyte PC is not really strained by the average show... a hundred and eighty K RAM disk is more than adequate to engulf all the display pages even for a hundred frame show such as the one used by the Copa nightclub.

There is only one item used by Pixel that does carry a first class price tag. Artwork is done mostly using the Createx C paint software developed by TV Ontario. This program directly generates NAPLPS files as a picture is drawn on the screen. The cost is a rather hefty fourteen hundred and fifty dollars. However, even in this case, Pixel doesn't use a graphics tablet... though it does own one of the Talos pads normally used with the Norpak page creation terminal. Apparently the group has found that the pixel by pixel precision of keyboard cursor control is more advantageous.

Telidon... always a bit of a Canadian specialty... is one area where we still seem to be leading, according to Pixel Productions. The feeling in the company is that although in hindsight one could point to some expensive flops, the millions the government has poured into the field has borne some worthwhile fruit. The major problem right now is that there seems to be absolutely no teaching of NAPLPS techniques, so aspiring computer artists will continue to be self taught.

As to the future of NAPLPS... its still too soon to tell. You can now have a complete NAPLPS system for under ten grand. This is still not a sum to be spent casually the average user. However, for anybody with a serious need for moderate graphics and animation, it could be quite a bargain.

Whatever happens on the home front, the future of Pixel Productions seems assured. As Michel Gabereau puts it, "Nobody today would dream of making a video which is not NTSC"... that being the universal video recording standard. Considering Pixel's non computing approach to NAPLPS, the company has gone an awful long way toward demonstrating the potential of this computer graphics standard. To Gabereau, working with NAPLPS is "not much different than TV production." He adds, "programming is like editing"... different means to a similar end. **CN!**

Hewlett Packard Plotter Review

Nothing scares the art department quite as well as a plotter that looks like it can do everything they can do without ever once begging for a raise. A plotter may well be a worthwhile peripheral even if you haven't got an art department to intimidate with it. Here's a look at one of the best.

by Steve Rimmer

Plotters are among those peripherals that almost everyone has heard of and almost no one owns. There's a decent reason for this... despite the rapidly diminishing price of computer toys in general, even relatively low end plotters can cost more than the computers that will be driving them.

The Hewlett Packard HP 7475A is not an inexpensive plotter. However, it is characteristic of a whole range of intelligent plotters and, more to the point, is the hard copy device which quite a number of popular graphics packages want to pour their hearts out to. Unlike many of the lower priced boxes it's able to produce large... ANSI B sized... drawings if it's called upon to do so. It has a lot of internal graphics language trolls, which makes designing custom software for it considerably less harrowing than it might be for dumber instruments.

On top of all this, of course, the 7475 looks slick when it's working. It impresses the help and makes the stock holders think you know what you're doing... certainly a worthwhile investment.

White Line Fever

The 7475 is a six pen plotter... that is, it can be commanded to draw in any of six colours, assuming that you had the foresight to buy six colours of pens. However, even in this there has been a lot of thought put into the system. If you tell it to plot something in a colour of pen it doesn't have it'll default to one it does.

The pens live in a carousel which allows the pen holder to grab whatever pen it takes a liking to.

Unlike the older style flatbed plotters in which a sheet of paper was stuck down to a board and a pen moved over it, the 7475 only moves the pen back and forth across the width of the paper. It gets around the length by rolling the paper in and out of itself, looking very much like a high tech wringer washer. This sounds like it should be hopelessly sloppy, but the 7475 can position its pen so accurately that it can plot a drawing four or five times over the same sheet of paper without any noticeable thickening of the lines.

The plotter is communicated with over an RS-232C serial interface in most cases. Its protocol is adjustable through DIP switches. As such, the plotter isn't specific to any particular computer. While I toodled around with it on an IBM PC, it could have been driven by a Macintosh, an Apple with a suitable serial card or even a Vic 20.

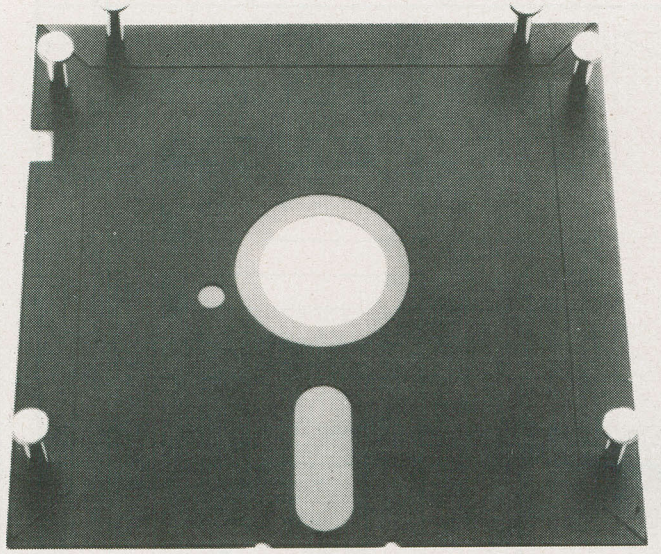
The secret's in the software, of course.

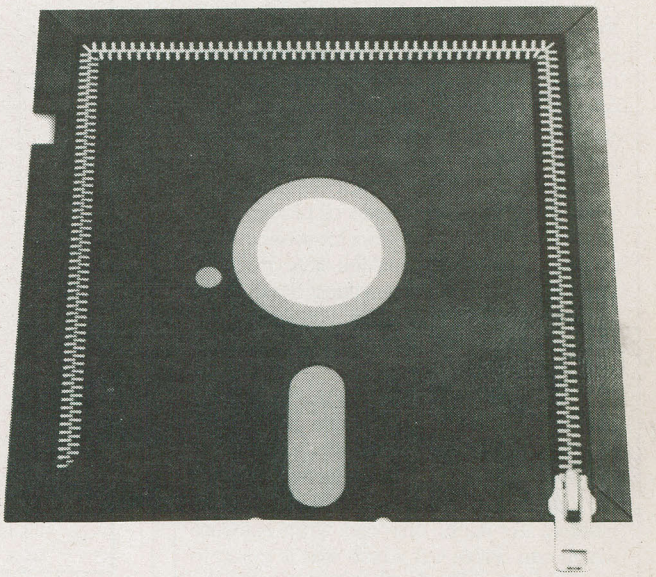
The movements of the plotter are controlled through something called HP-GL... which is, in human terms, the Hewlett Packard Graphics Language. This is a fairly terse set of two letter instructions which can be sent to the plotter to make it dance.

One could equip a plotter with a very simple language which only allowed one to specify the cartesian co-ordinates which one wanted the pen to move to... plus a command to raise and lower the pen itself. However, this would be extremely tedious to use and, all other things being equal, pretty slow.

The HP-GL language is quite far removed from this. Among its primitives are commands to tell the plotter to draw lines, fill areas, do arcs and circles, raise, lower and change the pen, change the pen's thickness and to report all sorts of thing about the plotter's status. This last group allows the plotter's driving software to be a lot more efficient, as it can know, for exam-

A slight exaggeration:





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Hewlett Packard Plotter Review

ple, when the plotter has finished with one command and is ready for the next.

The plotter's pen moves in what it regards as *plotter units*. A plotter unit is .025 millimeters, or .00098 inches. This is the resolution of the plotter's output, then. It amounts to something over a thousand lines to the inch. This is far in excess of anything one can do with a printer... and considerably more accurate than anything most human draftsmen can get together.

One can plot fairly simply by specifying everything in co-ordinates of plotter units. However, the plotter allows for scaling. One could, for example, tell the little troll that one wanted to scale everything down or up by any factor one wished... including by factors which differ between the horizontal and vertical axis.

There are also instructions to change the effective size of the area the plotter plots in, one to allow the driving software to know the *hard clip* limits... the effective edge of the paper... and one which will rotate its plotting. As such, one can write software which can figure out which axis is going to be longest and flip the drawing to make the best use of the paper.

Pen Pals

The instructions which manipulate the pen itself are probably a bit easier to fathom. If one sends PU, for example, the pen is lifted from the paper. PD puts it down. SP, for *select pen*, stashes the current pen and scoots off to get another one.

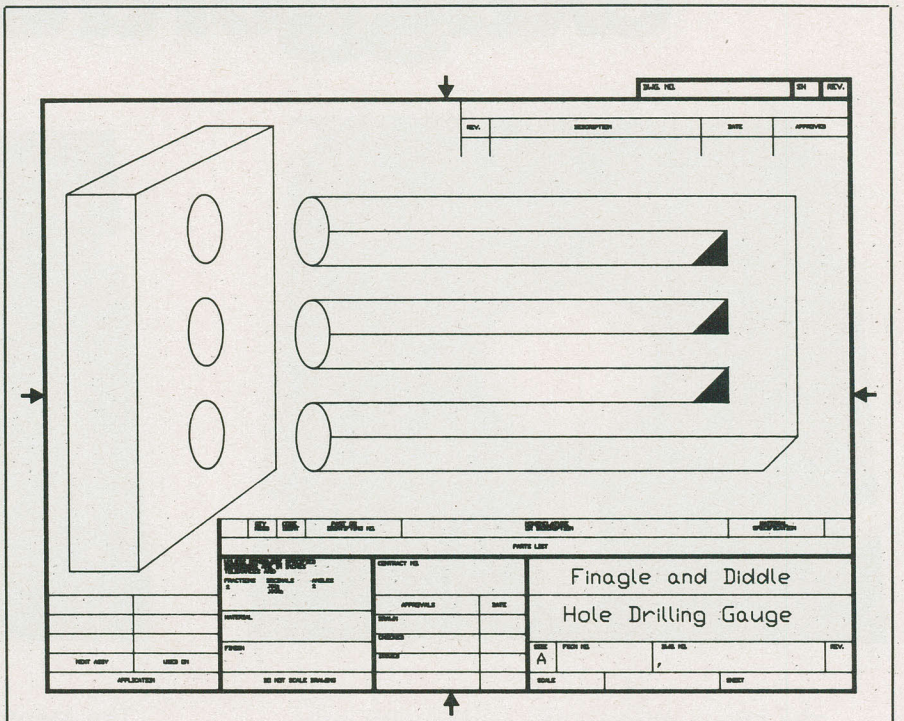
One can manipulate the actual plotting done by the pen in quite a number of ways. The pen can be told to move to any absolute co-ordinate on the paper. It an also be moved relative to its current position, as in "go over by a hundred units and down by two hundred and let's not have any lip, pen." Actually the complete syntax would be

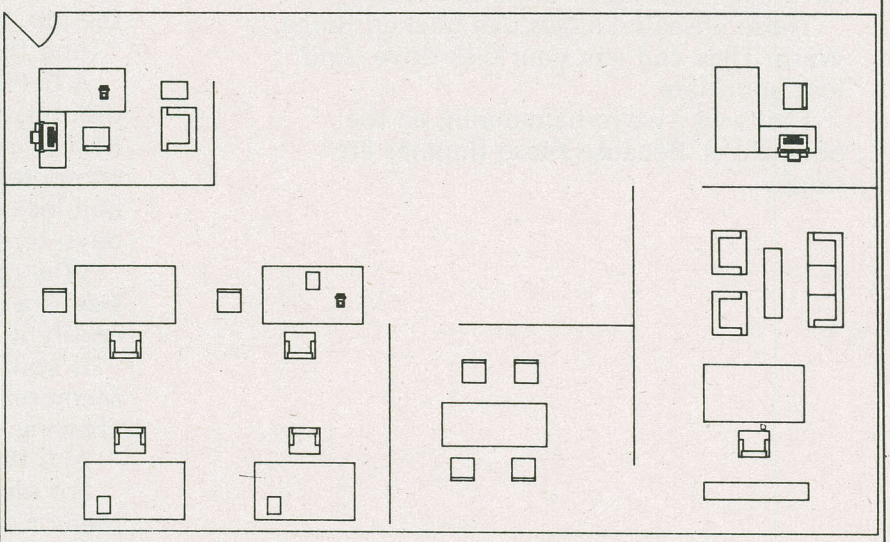
PR100,200

which isn't as authoritarian... but it does take up fewer bytes. The pens can be easily removed later on if you want to browbeat them individually.

Obviously, if one moves the pen while it is down it plots. If it's up it goes somewhere invisibly... presumably to commence plotting when it arrives.

The CI instruction draws circles. One can obviously specify how large the circle will be and where it will turn up. One can also describe the size of the chords which make up the circle... circles actually being approximations made up of straight lines. Shorter chords make for prettier circles... that take longer to plot.





These sample plots... all done with AutoCAD... illustrate the resolution the 7475 A is up for.

One can also instruct the plotter to draw arcs, or portions of circles.

The plotter will fill in specified areas, either with solid blocks of ink... made up of lots of lines spaced very tightly... or with parallel lines or a cross hatch.

There is an instruction for drawing rectangles. I know... you can do 'em pretty easily by just plunking the pen down and moving it about, but this is easier still. The fill instructions also cover filling in rectangles... and several other shapes.

Gilding the Plastic Lilly

The plotter usually wants to draw solid lines, but it doesn't have to. It can, for example,

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Hewlett Packard Plotter Review

draw dotted ones in a host of permutations of dots and dashes. There are also instructions to determine the thickness of the lines the thing spews forth, availing it of quite a variety of line effects.

Finally, the plotter can add text to its drawings. It holds nineteen internal character sets, which vary as to their symbols and other punctuation to allow one to plot in different languages. The text of the labels one adds to a drawing are interpreted in ASCII... after the appropriate instruction has been fired off to the plotter, of course.

The text does not have to be aligned with an edge of the paper. One can, in fact, have it leaping about at any angle one wants to. The direction of a label can be specified in absolute terms or relative to the last pen direction.

The size of the characters plotted is also variable... you can plot 'em any size you can fit on a piece of paper. By specifying negative character sizes the plotter does its text as mirror images.

There's also an instruction to specify the slant of the text. Essentially, this amounts to infinitely variable italics. It can render some pretty stoned looking plots.

More Toys

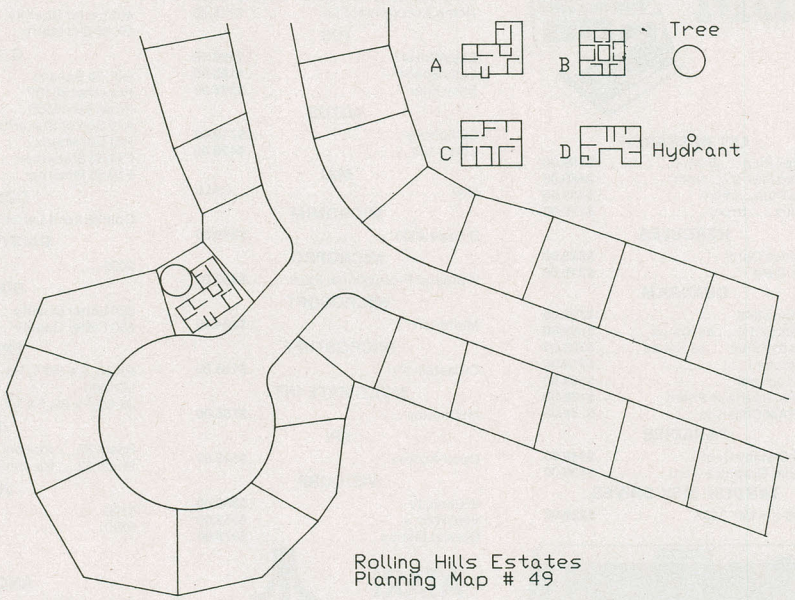
In use, the plotter performed flawlessly... although if one doesn't give it enough room to swing its paper its can lose its grip on reality and toss the sheet out. It's extremely fast, rendering complex drawings which fill an entire page in a couple of minutes. It's also quiet as plotters go.

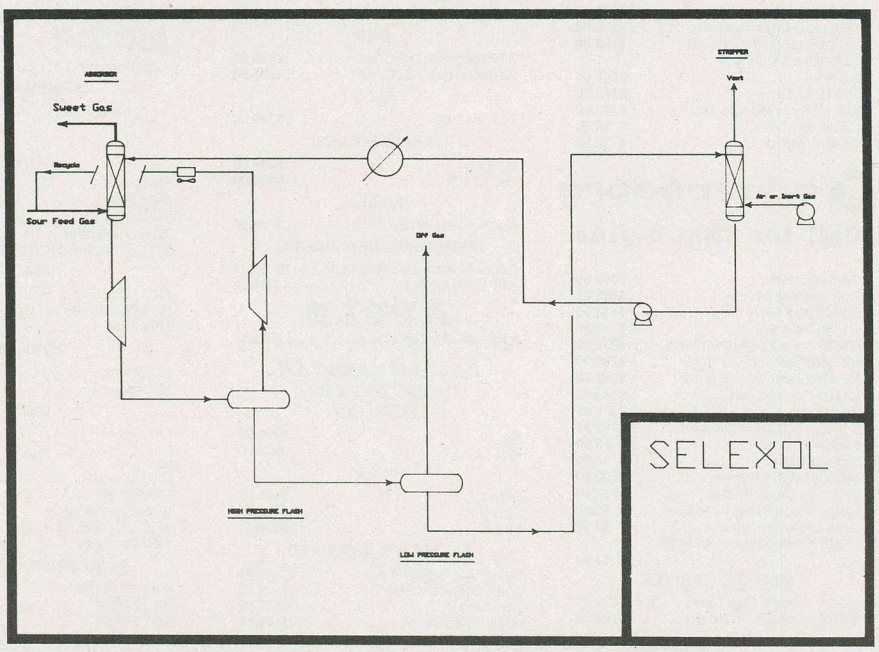
The accuracy of the 7475... even over a long haul of plotting... is admirable. It doesn't seem to be affected at all by either a lot of use or a lot of heat.

I used the plotter predominately with AutoCAD and from BASIC. The BASIC tests were pretty well predictable... one sends out the appropriate instructions and the thing does its stuff. This invariably wastes enormous amounts of paper, and is quite a lot of fun.

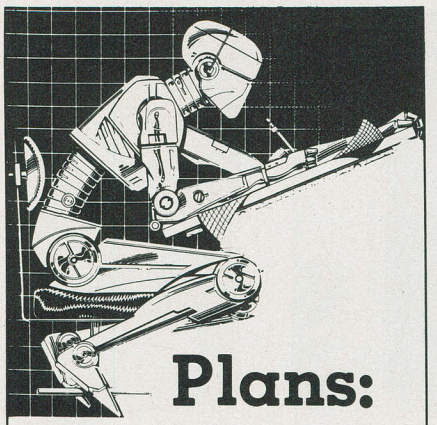
AutoCAD is a typical bit of commercial driving software which one would have control the plotter. The results of its drawings were incomparable. Really nasty complex things turned out looking like they'd been drawn four times up and shot down. It's hard to say how much of the plotter's language AutoCAD actually uses... and how much it fakes by hand... but its work was impeccable.

There are a few things which the plotter is capable of which one wouldn't ordinarily think of... or, at least, that I didn't. It will draw not only on paper but also... given the right ink... on film to create transparencies.





Anyone know what a selexol is?



Plans:

Plotter:	**HP 7475A**
Interface:	**RS-232C or HP-IB**
Programming:	**HP-GL, AGL, supporting third-party packages**
Paper Size:	**8.5" x 11" or 11" x 17"**
Operation:	**Intelligent rotating 6-pen carousel**
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There are commands in its repertoire to slow down the pen velocity in these cases.

The really slick sounding application for the 7475, however, is as a digitizer. There is a special light sensitive non-pen available for it which can be placed in the pen holder. Having done this one can have the thing read out the co-ordinates of the stuff on the paper the digitizer is moved over. Sufficiently clever software can reconstruct the paper image from this data.

The digitizer is fully supported in HP-GL.

The documentation which comes with the 7475 is easily as impressive as is the plotter itself. It consists of a pair of thick, well written manuals with pots of examples of the code one needs to write to drive the plotter. Included at the back of one of them is a whole host of BASIC programs to illustrate how one would control the plotter from various systems, including an Apple][+, a PET 2001... remember those... and, of course, a whole host of Hewlett Packard computers.

Of the plotters I've checked out so far, the 7475 is unquestionably the nicest... which is reasonable, considering what it costs. However, the lower priced plotters can be moderate turkeys in some respects, not the least of which is that many of them are not supported by the sorts of software one wants to drive a plotter with. Plotters... and the languages thereof... are not in any way interchangeable.

If you have need of a plotter the HP 7475A is unquestionably a decent place to start looking. **CN!**

Vector Interruptus for the PC

The PC's interrupts are not only useful... they can also be confused. Dazzle 'em with your brilliance and you can have them doing all sorts of tricks for you.

by Steve Rimmer

Whoever initially dreamed up the IBM PC probably thought very highly of interrupts, inasmuch as he saw fit to put the little bog lizards everywhere. There are more interrupts happening in a single PC than in a whole room full of Apples. If you can get a handle on the interrupts the world is your hat tree.

Actually, this article won't be dealing with using interrupts so much is it will be *ab*using them. You see, despite their mysterious overtones, the PC's interrupts are fairly easy to manipulate once you get into their little secrets. Having figured out the one quintessential bit of information which disguises the operations of these aforementioned interrupts... we'll get to that in a minute... you can make 'em do almost anything.

If you've done any assembler programming you will be aware of the interrupts which one uses to call up the system's resources. However, there are other ones which do all sorts of lower level stuff which can be equally interesting to meddle with. We're now going to have a look at the ways in which one can toot around in the vector tables.

The Quintessential Bit

The really important thing in understanding how the interrupts do their things lives down in the first few bytes of memory segment zero of the PC. You can see it if you get into debug and do

```
-D0:0
```

This is the command for debug to do a hex dump of the first bit of RAM in the machine.

This space is occupied by what is called the *interrupt vector table*. There is an entry in the table for each interrupt the system is likely to throw. Each one points to an *interrupt handler*, which is the code to do whatever it is that the interrupt was thrown for.

If we take the first interrupt, INT 0, as an example, the first four bytes in memory correspond to the address of its handler.

The second two are the memory address and the first two are the segment that the address lives in.

If you were to write a program which had INT 0 as an instruction... you won't if you have any sense, as all it does is to print *Divide Overflow* and return to DOS... the 8088, upon reaching this instruction would essentially call the routine pointed to by this address and segment.

Having observed the existence of these vectors, we can also observe that they can be changed. By writing sufficiently tricky code one might well change the contents of a table entry to point to one's own interrupt handler, rather than that of the operating system's. This has manifest uses if you aren't much up for what the operating system is doing with its interrupts, and think that you can improve upon them.

It's probably not all that likely that one would want to change the vectors of the common interrupts, like INT 10H and INT 21H, although one could. However, some of the low level system interrupts bellow piteously at the gods for meddling with their vectors.

There are a number of causes of interrupts on the PC... all of which are handled through this table. Having a program run into an INT instruction is certainly one, but there are a multitude of hardware interrupts as well. Two notable examples of the latter sort of interrupts are the one which happens when you hit the PrtSc* key and the one which happens eighteen times a second as a result of the PC's internal timer.

These interrupts happen because of electronic things which go down on the PC's motherboard. However, they look... at least to the computer... exactly the same as the interrupts produced by INT instructions.

Round Table

When you hit the PrtSc* key on the PC a lot of gates and flip flops and other technological mud grubbing gets into gear and the system throws the hardware equivalent of INT 5. This means that the system stops what it's doing and leaps to the routine pointed to by the sixth entry in the vector table. Bear in mind that the table starts at zero.

Under normal circumstances, this entry points to a routine in DOS, usually at 0FF54H in segment 0F000H.

When the processor finally gets to the number five interrupt handler it has to do a number of things. To begin with, it has to save its context... we'll get to that... perform a task... probably printing the screen... and restore its context before it returns from the interrupt.

In writing our own interrupt handlers we should keep glued prominently to our foreheads that, unlike INT instructions which we put in predictable locations in our programs, hardware interrupts can happen at any time during the execution of whatever they interrupt.

When the PrtSc* key is struck, then, the computer could be in the middle of just about anything. If it were suddenly to leap away and print the screen... using, one should expect, its registers in the process . . . it would return to where it was just before the interrupt quite nicely but with the contents of its registers in something of a state of disarray.

Therefore, the first thing we have to do in an interrupt handler is to push all the stuff that might get trashed by the handler up onto the stack. The handler can then do what it wants to do in peace. When it's done, we'll haul the stuff back off the stack and do an IRET... a return from interrupt instruction... to put the processor back where it started... all completely transparent to the program which was interrupted.

```
        COMMENT

        CLOCK - Generates CLOCK.COM

        The official Mickey Mouse watch
        for the IBM PC...

        Copyright (c) 1985 Steve Rimmer

        "C'mon, Goofy... Let's all go down to
        the clubhouse and drop acid..."



SECS    EQU     1               ;SECONDS BETWEEN UPDATES

SCRNSTAT        SEGMENT AT 0H
        DD      1CH DUP(?)      ;IGNORE FIRST 70H VECTORS
INTF    DW      1 DUP(?)        ;CODE ADDRESS
INTS    DW      1 DUP(?)        ;CODE SEGMENT
SCRNSTAT        ENDS

CODE    SEGMENT PUBLIC  'CODE'
        ASSUME  CS:CODE,DS:SCRNSTAT,SS:CODE
        ORG     100H
SEETIME:
        JMP     SET_VECTOR

PRINT_TIME      PROC    NEAR

        PUSH    DS              ;SAVE DATA SEGMENT
        PUSH    AX              ;SAVE AX

        MOV     AX,CS           ;MAKE DATA SEGMENT
        MOV     DS,AX           ;LOCAL CODE SEGMENT

        MOV     [STKPNT],SP     ;SAVE OLD STACK POINTER
        MOV     [STKSEG],SS     ;AND SEGMENT

        CLI                     ;DISABLE INTERUPTS
        MOV     SP,OFFSET STACK ;MAKE LOCAL STACK
        MOV     SS,AX
        STI                     ;RESTORE INTERUPTS

        PUSH    ES
        PUSH    BP
        PUSH    DS              ;SAVE REGISTERS
        PUSH    AX              ;WHICH MIGHT GET
        PUSH    BX              ;GORCHED
        PUSH    CX
        PUSH    DX
        PUSH    DI
        PUSH    SI

        MOV     AX,CS           ;MAKE EXTRA SEGMENT EQUAL
        MOV     ES,AX           ;CODE SEGMENT

        INC     [COUNTER]       ;BUMP UP COUNTER
        MOV     AX,[COUNTER]    ;SEE IF IT'S TIME TO
        CMP     AX,18 * SECS    ;DO SCREEN UPDATE
        JNE     EXIT            ;IF NOT, WE DONE

        MOV     AH,15
        INT     10H             ;GET PAGE

        MOV     AH,3
        INT     10H             ;GET CURSOR POSITION
        MOV     [CURPOS],DX     ;AND SAVE IT
        MOV     [CURSZE],CX

        MOV     CX,0
        MOV     DX,0
        MOV     AH,1
        INT     10H             ;TURN CURSOR OFF

        MOV     DX,0046H
        MOV     AH,2
        INT     10H             ;POSITION CURSOR
```

Vector Interruptus for the PC

```
        CALL    TIME            ;SHOW THE TIME

        MOV     AH,15
        INT     10H             ;GET PAGE

        MOV     DX,[CURPOS]
        MOV     AH,2
        INT     10H             ;POSITION CURSOR

        SUB     AX,AX
        MOV     [COUNTER],AX    ;ZERO COUNTER

        MOV     CX,[CURSZE]
        MOV     AH,1
        INT     10H             ;RESTORE CURSOR SIZE


EXIT:   POP     SI
        POP     DI
        POP     DX              ;GET THE REGISTERS
        POP     CX              ;BACK, JACK
        POP     BX
        POP     AX
        POP     DS
        POP     BP
        POP     ES

        CLI
        MOV     SS,[STKSEG]     ;RESTORE OLD STACK
        MOV     SP,[STKPNT]
        STI
        POP     AX
        POP     DS              ;LAST FEW POPS

        IRET                    ;AND RETURN

STKSEG:         DW      0000H   ;STASH FOR STACK SEGMENT
STKPNT:         DW      0000H   ;STASH FOR STACK POINTER
CURPOS:         DW      0000H   ;STASH FOR CURSOR POSITION
CURSZE:         DW      0000H   ;STASH FOR CURSOR SIZE
COUNTER:        DW      0000H   ;UPDATE COUNTER
                DB      128 DUP(0)
STACK:          DW      0000H   ;LOCAL STACK

PRINT_TIME      ENDP

TIME    PROC    NEAR
        CALL    CLOCK           ;GET THE CLOCK VALUE

        MOV     AL,CH
        CALL    DIGIT           ;SHOW HOURS
        MOV     AL,CL
        CALL    DIGIT           ;SHOW MINUTES
        MOV     AL,DH
        CALL    DIGIT           ;SHOW SECONDS
        RET
TIME    ENDP

DIGIT   PROC    NEAR
        PUSH    CX
        PUSH    DX              ;SAVE REGS
        MOV     AH,0
        PUSH    AX              ;SAVE VALUE
        MOV     CL,10
        IDIV    CL              ;DEVIDE BY TEN
        PUSH    AX              ;SAVE IT
        ADD     AL,'0'          ;ADD ASCII OFFSET
        CALL    PRINT           ;SHOW IT
        POP     AX              ;GET IT BACK
        MOV     CL,10
        IMUL    CL              ;MULTIPLY BY TEN
        MOV     DX,AX           ;GET IT IN DX
        POP     AX              ;GET BACK ORIGINAL VALUE,
        SUB     AX,DX           ;DIFFERENCE IS ONES
        ADD     AL,'0'          ;ADD OFFSET
        CALL    PRINT           ;SHOW IT
        MOV     AL,20H          ;AND PAD A SPACE
        CALL    PRINT
        POP     DX
        POP     CX
        RET
DIGIT   ENDP

PRINT   PROC    NEAR            ;PRINT CHARACTER IN AL
        PUSH    CX
        PUSH    DX
        PUSH    AX
        MOV     AH,15
        INT     10H
        POP     AX
        MOV     AH,14
        INT     10H
        POP     DX
        POP     CX
        RET
PRINT   ENDP

CLOCK   PROC    NEAR
;       This routine simulates INT 21H, AH=2C
;       It returns with the hours in CH, minutes in CL
;       and the seconds in DH, derived from the absolute
;       timer tick count.

        MOV     AX,0000
        INT     1AH             ;GET NUMBER OF TICKS
        MOV     AX,CX
        MOV     BX,DX
        SHL     DX,1
        RCL     CX,1
        SHL     DX,1
        RCL     CX,1
        ADD     DX,BX
        ADC     AX,CX
        XCHG    DX,AX
        MOV     CX,0E90BH
        DIV     CX
        MOV     BX,AX
        XOR     AX,AX
        DIV     CX
        MOV     DX,BX
        MOV     CX,00C8H
        DIV     CX
        CMP     DL,64H
        JC      NOCRY
        SUB     DL,64H
NOCRY:  CMC
        MOV     BL,DL
        RCL     AX,1
        MOV     DL,00
        RCL     DX,1
        MOV     CX,003CH
        DIV     CX
        MOV     BH,DL
        DIV     CL
        XCHG    AL,AH
        MOV     DX,BX
        XCHG    CX,AX
        RET
CLOCK   ENDP
END_PRINT_TIME:                 ;END OF RESIDENT ROUTINE

SET_VECTOR:
        PUSH    DS              ;SAVE DATA SEGMENT
        XOR     AX,AX           ;MAKE AX
        PUSH    AX              ;POINT INTO THE
        MOV     AX,SCRNSTAT     ;SEGEMENT WITH THE VECTORS
        MOV     DS,AX           ;AND MAKE IT THE DATA SEGMENT
        CLI                     ;KEEP INTERUPTS AT BAY
        LEA     AX,PRINT_TIME   ;POINT TO OUR HANDLER
        MOV     INTF,AX         ;AND PUT POINTER IN TABLE
        MOV     INTS,CS
        LEA     DX,END_PRINT_TIME
        STI                     ;RESTORE INTERUPTS
        POP     AX
        POP     DS
        INT     27H             ;TERMINATE BUT STAY RESIDENT
CODE    ENDS
        END     SEETIME
```

The second program in this feature is a new interrupt handler for the PrtSc* key. If you hit the PrtSc* key when you haven't got a printer attached to the PC the system will usually hang. This is most unfortunate if you have just captured the enchanted sword and are about to steal out of the dungeon after thirty–two hours of play.

If you have had the forethought to have assembled and run PRTSC.COM... the result of program two... hitting the PrtSc* key will cause the screen to clear and the message

**Leave the PrtSc*
Key Alone**

to be displayed. Having done this, the interrupt will return and you'll be right back wherever you were when you hit the key.

This is a fairly trivial program... and not one your life is likely to be empty without, to be sure. However, it serves to illustrate the workings of a very simple interrupt handler.

Most of the code in this program doesn't get run when you type PRTSC at the keyboard. Rather, it gets loaded into memory and largely forgotten about. The only immediate part of the thing that does anything is the bit at the very end. This is the vector table patcher.

Patching the vector table is actually fairly easy. We want the number five vector to point to our code. This means that the address part should be set to the value of the PRINTSCREEN label, which in this case will be 103H, since the program ORGs at 100 and the initial JMP is three bytes long. The segment part should be loaded with whatever the current code segment is.

If you stare at the code for a few seconds you'll be able to see how it works. It loads AX with SCRNSTAT, which is zero, and makes the data segment equal to that. The CLI instruction prevents an interrupt being thrown while we're in the process of getting all this together... the interrupt could come down while the table is half patched, sending it along to parts unknown.

Having done all this, we can move the appropriate values into the appropriate bits of the data segment. Since the data segment is the same segment as holds the vector table, we'll be effectively POKEing things into the vector table.

The INT 27H instruction is probably a bit unfamiliar. It's a special DOS interrupt which allows code which has been placed in memory to stay resident. In this case, it means that the next program that is loaded in will start after the end of our new handler, rather than overwriting it.

The Handle

The interrupt handler for this program is fairly uninvolved. It uses few registers and, as such, there isn't a whole lot of context to push up on the stack before we can start.

There is one important trick in writing simple handlers like this one. One can use all the BIOS interrupts one fancies... the DOS interrupts, from type 20H on up, will probably cause one's code to behave unpredictably.

Having saved the affected registers, cleared the tube, set up the cursor to position the holy words in the centre of the glass the program prints the string at MESSAGE. This is pretty straight up code... except that it uses a type 10H interrupt, rather than the emminently more convenient type 21H trip.

Note that both this program and the one we're about to look at assemble into COM, rather than EXE files. You'll want to use EXE2BIN on 'em after they're linked.

The first program is a bit more complicated... although you will be able to see the structural similarities between it and the

Vector Interruptus for the PC

screen print handler we've just checked out. It makes use of the rather obscure 1CH interrupt to print the running time from the system's real time clock up in the right hand corner of the screen. It actually leaps up there and prints it once a second and returns both the system's registers and the screen condition... the cursor position and so on... to exactly where it found them.

This is an extremely simple clock. You can elaborate on it quite a bit if you want to.

The 1CH interrupt is a dedicated hardware deal. It is thrown eighteen times a second by the 8253 timer chip in the PC. In the normal course of affairs it points to an IRET instruction up in DOS. In other words, it returns as soon as it's thrown, doing nothing.

It can be used, however, to do anything that requires frequent transparent updating... such as displaying the time on the screen. By printing the time once a second the program takes care of both the relentless march of eternity and the scrolling of the screen, which tends to boot the time off the top quite frequently.

The interrupt handler for the clock is, perhaps understandably, quite a bit more involved than is that of the screen print trap. It trashes rather more registers. Furthermore, it is likely to interrupt more things... not the least of which is the inputting of data from the keyboard. As such, it must be a bit more careful in saving its context.

The clock, among other things, cannot know how much stack space whatever it is interrupting has available for its use and, because it uses the stack quite a bit, it must establish a local stack for its own use. This is fairly easy... it just moves the stack segment and stack pointer to reflect a buffer within itself. However, because another interrupt could happen while the stack is being fudged, and try to use the clock's not quite completely defined local stack for its own use, we again must use a CLI instruction to turn off the system's interrupts while this being done.

The clock itself is moderately complex, made more so by our being unable to use the simple time of day routines provided by INT 21H. The first thing we'll want to do is to see if the time needs updating. The COUNTER buffer is incremented each time the handler is called and, as we know it's being hit eighteen times a second and as we want to display the time once a second we can simply have it count up to eighteen, doing nothing until it gets there.

The second aspect of the context which the handler must preserve is the size and position of the cursor. We're going to move the cursor to print the time and turn it off so it isn't constantly seen bouncing around the tube. Thus, its state must be remembered so that it can be restored when the clock has done its thing.

The clock itself starts with TIME, which calls the routine CLOCK. The CLOCK code reads the contents of a thirty-two bit number returned by INT 1AH which represents the number of ticks which have transpired since the system was first turned on... adjusted for whatever the time has been set to either by the DOS TIME command or by a real time clock hooked into the system.

A tick happens eighteen... or, more precisely, 18.2... times a second.

When called, CLOCK reads the tick count and breaks it up into a seconds count in DH, minutes in CL and hours in CH... essentially what the DOS 21H interrupt does.

The DIGIT routine is a simple two digit decimal converter. It takes the value in AL and prints it as a two digit decimal number... from zero to ninety-nine... followed by a space.

Having shown the time, the handler goes around and undoes everything it did a while back. It puts the cursor back where it

```
        COMMENT

Example of a resident interrupt handler. This little
sloth rancher gets loaded and stays resident in memory.
It reroutes the number five vector... the PrtSc* key...
to itself so that they key will make something else
happen.

        Copyright (c) 1985 Steve Rimmer

        Shake well before detonating...



UL      EQU     0D5H    ;SYMBOLS WHICH
UR      EQU     0B8H    ;MAKE UP A BOX
LL      EQU     0D4H
LR      EQU     0BEH
HB      EQU     0CDH
VB      EQU     0B3H

CR      EQU     'M'-40H
LF      EQU     'J'-40H

SCRNSTAT        SEGMENT AT 0H
        DD      5 DUP(?)        ; SKIP FIRST FOUR VECTORS
INT5OF  DW      1 DUP(?)        ; OFFSET VECTOR FOR INT 5
INT5CS  DW      1 DUP(?)        ; SEGMENT VECTOR FOR INT 5
SCRNSTAT        ENDS

CODE    SEGMENT PUBLIC  'CODE'
        ASSUME  CS:CODE,DS:SCRNSTAT,SS:CODE
        ORG     100H
PRTSCRN:
        JMP     SET_VECTOR

PRINT_SCREEN    PROC    NEAR
        STI                     ;ENABLE INTERRUPTS
        PUSH    DS              ;SAVE REGISTERS
        PUSH    AX              ;WHICH MIGHT GET
        PUSH    BX              ;GORCHED
        PUSH    CX
        PUSH    DX

        MOV     AX,CS           ;MAKE DATA SEGMENT EQUAL
        MOV     DS,AX           ;CODE SEGMENT

        MOV     AX,0600H
        MOV     CX,0000H
        MOV     DX,1850H
        MOV     BH,7
        INT     10H             ;CLEAR SCREEN

        MOV     AH,15
        INT     10H             ;GET PAGE
        MOV     DX,0800H
        MOV     AH,2
        INT     10H             ;POSITION CURSOR

        MOV     BX,OFFSET MESSAGE

LOOP1:  MOV     AL,[BX]         ;GET BYTE OF MESSAGE
        CMP     AL,0            ;SEE IF IT'S ALL OVER
        JE      NOBOX           ;SLIP SLIDIN' AWAY
        PUSH    BX              ;SAVE POINTER
        MOV     AH,14           ;AND HEAVE
        INT     10H             ;THE BYTE
        POP     BX              ;GET POINTER
        INC     BX              ;BUMP POINTER
        JMP     LOOP1           ;CARRY ON

NOBOX:  MOV     AH,15
        INT     10H

        MOV     DX,1700H
        MOV     AH,2
```

```
        INT     10H

        POP     DX              ;GET THE REGISTERS
        POP     CX              ;BACK, JACK
        POP     BX
        POP     AX
        POP     DS
        IRET                    ;AND RETURN

MESSAGE:                        ;CHANGE THIS IF YOU WANT TO
        DB      CR,LF
        DB      29 DUP(' '),UL,20 DUP(HB),UR,CR,LF
        DB      29 DUP(' '),VB,20 DUP(' '),VB,CR,LF
        DB      29 DUP(' '),VB,'  Leave the PrtSc* ',VB,CR,LF
        DB      29 DUP(' '),VB,'     Key Alone     ',VB,CR,LF
        DB      29 DUP(' '),VB,20 DUP(' '),VB,CR,LF
        DB      29 DUP(' '),LL,20 DUP(HB),LR,0

PRINT_SCREEN    ENDP

END_PRINT_SCREEN:               ;END OF RESIDENT ROUTINE
SET_VECTOR:
        PUSH    DS              ;SAVE DATA SEGMENT
        XOR     AX,AX           ;MAKE AX
        PUSH    AX              ;POINT INTO THE
        MOV     AX,SCRNSTAT     ;SEGEMENT WITH THE VECTORS
        MOV     DS,AX           ;AND MAKE IT THE DATA SEGMENT
        CLI                     ;KEEP INTERUPTS AT BAY
        LEA     AX,PRINT_SCREEN ;POINT TO OUR HANDLER
        MOV     INT5OF,AX       ;AND PUT POINTER IN TABLE
        MOV     INT5CS,CS
        LEA     DX,END_PRINT_SCREEN
        STI                     ;RESTORE INTERUPTS
        POP     AX
        POP     DS
        INT     27H             ; TERMINATE BUT STAY RESIDENT
CODE    ENDS
        END     PRTSCRN
```

found it, sets up the stack segment and pointer to what they were before its was called and pops all the values from the stack. Then it throws an IRET and returns to the program from which it was called as if nothing had happened.

You might well think that having CLOCK.COM going would slow everything down considerably, as whatever was running in the foreground while CLOCK was busy fudging and unfudging its stack would only get to go in between interrupt ticks. This is technically true, but the few hundred bytes of CLOCK represent a tiny portion of what the processor can do in one eighteenth of a second. In practice, unless you make an interrupt handler monsterously large, it has no meaningful effect on the performance of the system.

By the way, there are some programs which deliberately go in and make sure that the 1CH interrupt is pointing directly to an IRET... either to keep their screen displays looking fastidious or to maximize their use of the processor. The CASTLE game in the most recent Almost Free PC software collection did this... and then thoughtfully restored the vector to the handler when it was done.

Vectory is Mine

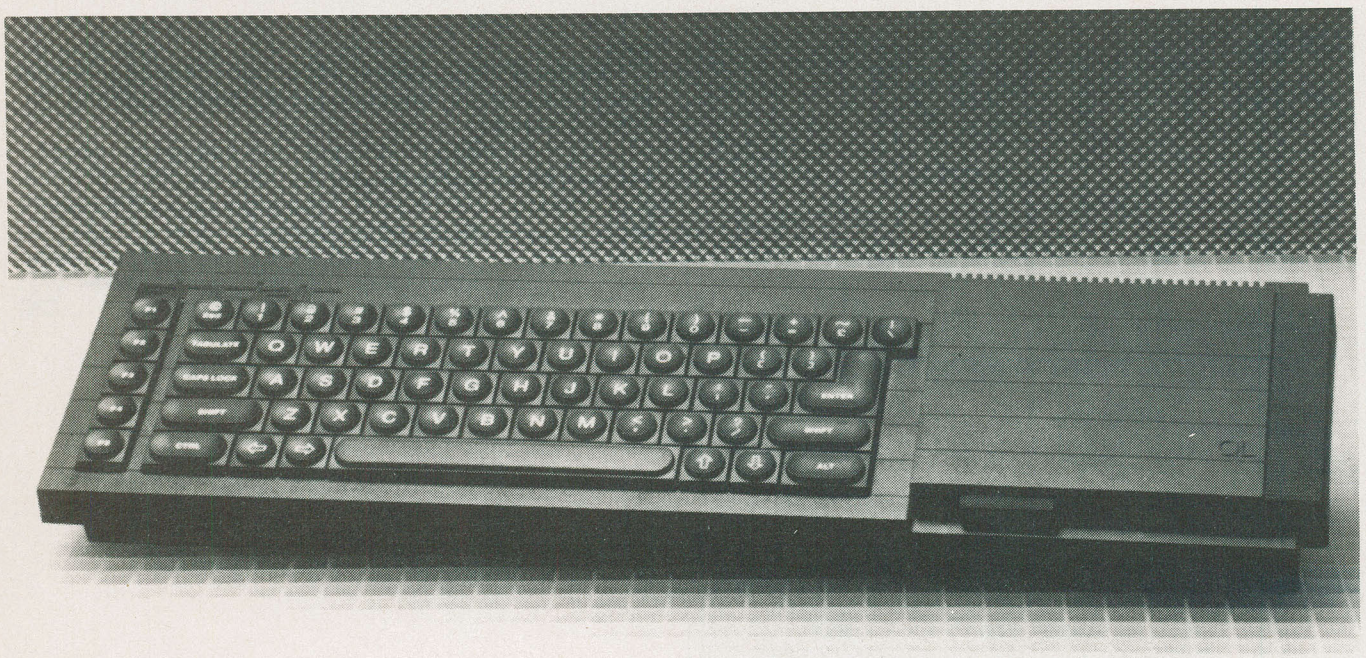
Altering the vector table in this way can give you enormous control over the low level workings of the PC... inasmuch as almost everything in there that moves or salutes is handled by an interrupt. It's an awesome power.

Among the many potential uses for this technique are changing the messages printed by various error interrupts. For example, the divide by zero message could say "Ack! There's a wombat in the works..." This isn't terribly informative, but if you have to have error messages anyway you might as well have colourful ones.

The parity error interrupt, INT 2, could be made to tell you where the nasty parity error is occurring, rather than simply locking up the system.

You might want to devise your own interrupt functions for otherwise unused interrupts, like INT 15H, cassette communications. Let's see... if AH is set to zero it runs a game of "Smash the Bunny". If AH is one it plays a selection of the best of the Grateful Dead though the speaker. If AH is set to two it sets up a serial communications link to God and drops into terminal mode. If AH is three... hmm, what could top AH set to two... **CN!**

Sinclair QL Review



Perhaps the most unusual computer since Charles Babbage first started grinding his gears, the Sinclair QL is the latest progeny in a long line of small black bits of plastic.

by Steve Rimmer

The name Sinclair conjures visions in many of us of some of the most inspired abberations in high technology. There is, of course, that most notable bacteria of microcomputers, the ZX–81... but souls with longer memories will recall a host of funny little calculators and a digital watch which ran for up to a month on a king's ransom in hearing aid batteries.

Clive Sinclair has always been ahead of his time... except when the hearing aid batteries died unexpectedly.

The Sinclair QL is a reasonable looking extension to this great legacy. It has all of the hallmarks... it's diminishingly small, made entirely of black styrene plastic, completely incompatible with anything else in creation and nicely set up to be a world unto itself. Also in keeping with tradition it makes remarkably good use of the state of the art.

At least the screen doesn't go blank every time it runs a program.

Quantum Mechanics

The Sinclair QL... that's quantum leap, by the way... is blasted along by a 68008 microprocessor, a variation of the chip which ticks away inside the Apple Macintosh. This is highly slick... it makes things like the screen display extremely fast and the software which runs on the system pretty tight.

The computer itself resembles some sort of sophisticated calculator. About a foot long, its top is almost entirely dominated by its keyboard. Unlike the gorilla style ZX–81 membrane thing, the QL's keys are full travel types with a somewhat weird... but not entirely unpleasant... feel to them. They, too, make one think of a calculator, but a fairly good one.

Off to stage right there are the microdrives. The QL doesn't use anything as pedestrian as floppy disks... its mass storage is handled by the tiniest custom made cassette tapes you've ever seen. Slightly larger than a postage stamp, these little leprechauns seem to be able to spew data on and off themselves at about a quarter of the speed of a conventional floppy.

A microdrive cassette holds something on the order of eighty kilobytes. However, the catch... as is the catch with any sort of tape based storage... is that it takes phenomenally longer to get the byte at the other end of the tape than it does the one the drive's heads are sitting on. The access time of a microdrive is to some extent the luck of the draw.

The QL will display its stuff on either a conventional television set or an RGB colour monitor. When it initially boots one gets to select which way things are going to show up. I actually got to try out several permutations of QLs and tubes in the course of this official fiddle, both using a standard RGB monitor and a British PAL television. The displays of both were extremely tight...

interestingly, the thing was quite happy with a North American monitor.

The version of the QL which will be sold here will be adapted for local tubes, which, I'm told, will make the picture better still.

The Sinclair is capable of displaying things in full colour. You have a choice of eight colours in its medium resolution mode and four in its high resolution mode. This is comparable to the colour facilities of the IBM PC... although the choice of colours under the Sinclair is a bit more restricted.

Call the Translator

Like the Apple][+ and the Commodore 64, the command level operating system of the QL is its resident BASIC. In other words, having decided whether you have an RGB monitor or a television, the next thing you tell the system to do should be a BASIC instruction for a minimum of error messages.

This is not always true, because the microdrive cassettes can be made to self boot programs. There's a little tab one snaps off the cassette to indicate that it's intended for immediate glory. As such, things like the system's word processor or spread sheet can bypass the BASIC step and zap themselves into RAM directly.

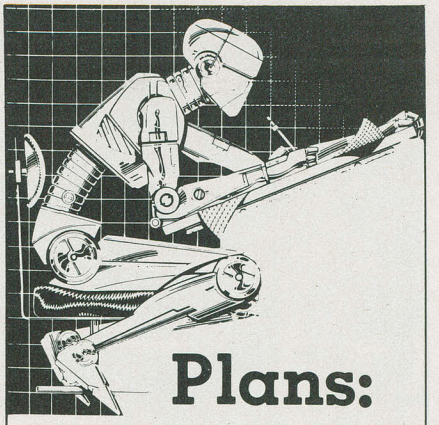
Ignoring all this application flotsam for a second, however, one is confronted with SuperBASIC when the screen settles down. This shows one a command area at the bottom of the screen and two boxes, one white and one red, at the top. The white box is a listing window, while the red box shows whatever the computer heaves to the screen as output.

The size and existence of the boxes can be manipulated under program control, of course, so one need not look at the list window, for example, all the time.

SuperBASIC is a singularly powerful little language... and, if you are used to the more common Microsoft syntax for BASIC, a highly strange one. However, to be sure it features a number of things that Microsoft BASICs don't support.

Entering BASIC lines into the QL is not as easy as would be using a PC or a Macintosh... it's about on par with the BASICs one encounters on CP/M based machines. To edit a line, for example, one types EDIT and then the line number.

There are two things about the BASIC one immediately notices. The first is a peculiar arrangement for deleting characters. The left and right arrow keys on the keyboard move the cursor... non-destructively... through a line of text. In order to backspace and delete one needs hold down the control key while hitting the left arrow key. This isn't as inconvenient as it sounds... the control key is immediately beside the left arrow key... but it takes some getting used to. Hitting the control and right arrow keys simultaneously deletes the characters to the right.



Plans:

System:	**Sinclair QL**
Operating System:	**QDOS, SuperBASIC**
RAM:	**128K**
Storage:	**Two 100K cassette microdrives**
Screen Format:	**40/60/85x25**
Graphics:	**256/512x256 pixels**
Software Included:	**Quill, Abacus, Archive, Easel**
Manufacturer:	**Sinclair Research Limited**
Available From:	**EDG Electronic Distributors Inc., 3950 Chesswood Drive Downsview, Ontario M3J 2W6 (416) 636-9404**
Suggested Retail:	**$799.95**

The other interesting facet of SuperBASIC is that it does a syntax check on every line as it's entered. If the code doesn't pass muster it stops and complains. I assume it beeps when it does this... our QL was beepless, presumably because it like to play through the speaker of whatever sort of tube it's attached to. The RGB monitor was a mute.

Some of the syntax of SuperBASIC will be familiar if you've used other machines. However, a lot of it is just a bit strange. Strings, for example, are treated as packed arrays. There is no MID$ function. One would extract the middle three characters of a nine character string by saying

```
SMALL$ = BIG$(4 TO 6)
```

Perhaps the most interesting aspect of the Sinclair's BASIC, however, is its graphics. Considering the system's price the graphics are highly decent. Given a reasonable monitor the images the system can produce are crisp and stable. The graphics commands are moderately rich and pretty fast.

There are, to begin with, the usual sorts of BASIC graphics commands. The thing will do lines, circles, fills, arcs and so forth. However, there is, in addition, a command to pan the entire screen around. There are also these turtle graphics in there.

Turtle graphics are generally considered to be the province of LOGO... a language only a teacher could love. It's hard to say what they're doing in SuperBASIC, but they don't bother you if you don't bother them.

The QL and RGB Monitor

Sinclair QL Review

Playing with turtle graphics is amusing for a while... they're a departure from the usual way in which one draws pictures. One has to imagine that there is a turtle on the screen with a paint brush tied to its tail. One can raise and lower the paintbrush. If the brush is down, the turtle's path will be traced by a line.

A turtle may not have been the ideal choice for an image in all this... the graphics are pretty lively.

Having appropriately equipped one's turtle one can tell it to move any number of pixels along its current heading, turn any number of degrees or to have it turn onto a specific heading. This allows one to draw pretty well anything with a series of moves and turns... it's a lot more effective when it's combined with the more common forms of BASIC graphics.

In a more sedate area of computer life, the system supports quite a number of profound programming facilities. There is automatic line numbering. The system's serial ports are supported from BASIC... at least to a limited extent. One must, for example, set them both to the same baud rate. There is a sophisticated error trapping facility built in. One can change the size of the text on the screen in one pixel increments.

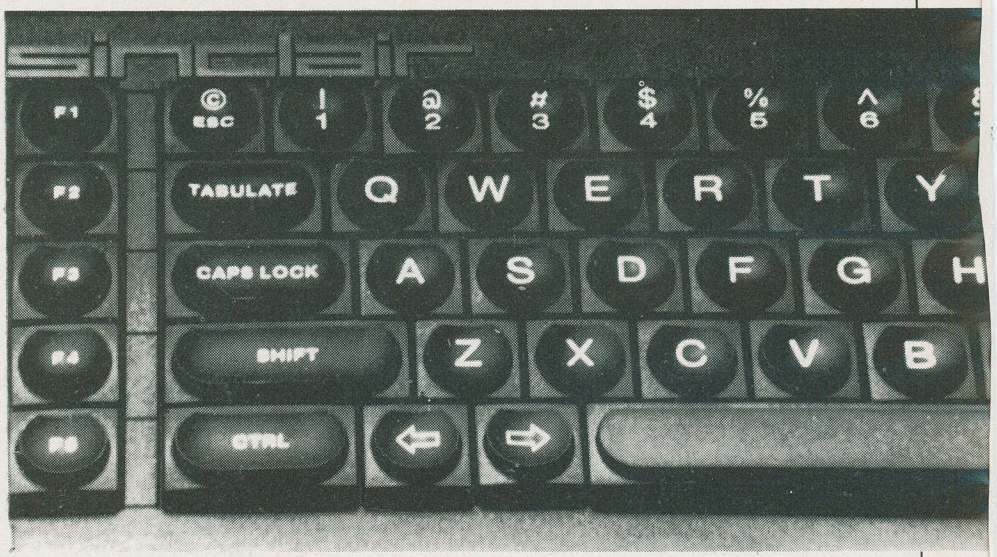
The system supports multiple line functions and procedures, two aspects of programming most BASIC users never get to try out. There is also SELECT, the equivalent of a CASE statement.

SuperBASIC is moderately decent. Its editing facilities could be better... its graphics are a party. Its syntax, while as workable as anything else, may confuse some users of other BASICs.

Other Bits

In addition to its on board BASIC, the QL comes with four tapes of applications software. These include a word processor called Quill, a spreadsheet called Abacus, a data base manager entitled Archive and a business graphics composer not surprisingly christened Easel.

I had a play with Quill and Abacus. The remaining two packages require considerable time to set up before they're of any use... we didn't have the QL for very long.



As word processors go, Quill isn't half bad. Given a monitor to play with it displays an eighty column screen... although it takes up about a quarter of the vertical dimension with various manifestations of status lines and menus.

Be warned... the examples in the manual all use bits of Genesis as sample text. That's God's old book, not Peter Gabriel's old band.

As with most word processors, one positions the Quill cursor somewhere on the tube and starts bashing at the keys. The software does automatic line ending and justification. It also allows for some printing effects... specifically bold text, underlined text and two sizes of characters. The effects show up on the screen.

The system will justify text in a number of ways, allowing for justification of one margin, both margins or no margins at all... the latter resulting in text aligned to the centre of the page.

There are search and replace and extremely flexible block manipulation instructions in Quill. One can have headers and footers in a printed document. I can't say how well the QL prints, as we didn't get a compatible printer with it.

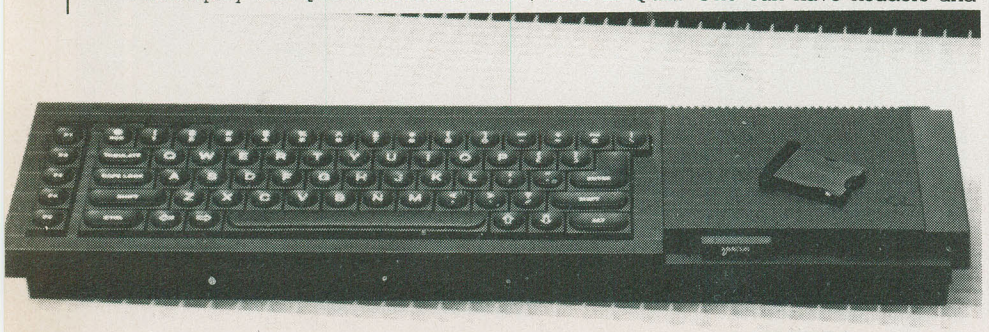
Quill is a small word processor... one wouldn't want to compare it to something like WordStar. However, as small word processors go it's one of the best, certainly a hand and a foot above, say, Paperclip for the Commodore 64. It's up for doing short manuscripts, letters and other small documents.

Abacus, the spreadsheet, is also fairly powerful. Like SuperBASIC, its syntax and commands differ in many respects from that of the more common packages, like Supercalc or Lotus. However, its facilities are comparable to many of the moderate spreadsheet packages. Unless you are up for doing sheets with enormous dimensions Abacus will probably prove sufficient.

Like any self respecting spreadsheets, one can enter formulae, data or text into an Abacus cell. Unlike some other sheets, Abacus doesn't advance the cursor when one has filled the cell, a decided annoyance. On the other hand, the sheet has selectable automatic calculation, a worthwhile feature. It can generate simple bar charts, something which is unexpectedly useful in analysing complex data.

There are a number of commands available for copying data from one part of a sheet to another. One can combine several sheets, and delete parts of a sheet. There is a global command for handling the units in which data is displayed... one might want the information represented as percentages, or dollars and cents, pure numbers and so on. One can also zap a whole sheet.

Abacus also supports a split window, so one can peer at two noncontiguous sections of a large sheet.



Abacus is fast and relatively easy to use. Its command structure makes a kind of sense once you get used to it and much of it speaks of being considerably well thought out. It didn't glitch once. Its help facility, being a tape file, is a bit tedious.

The Gripes of Wrath

I have relatively few complaints about the Sinclair QL. Its keyboard is not as comfortable as that of a full sized system. On the other hand, it's arguably better than those sold with some of the low rent PC clones.

The software which comes with the system is limited... it's decidedly "home" stuff, rather than being of a scope which would make it suitable for business applications... but it acquits itself extremely well in this context. It appears to have been well thought out and debugged.

There is not the library of software available for the QL which graces more common systems, but this may change as the system grows. There is, apparently, a decent collection of stuff for it in Britain.

The system's microdrive tapes are slow when compared to a floppy... although users of older cassette based systems will think they've been handed down from on high or California. I would imagine that, due to their construction, they have a very defined life and, should one fail it could be expected to do so catastrophically and irrevocably. One would want to be rather religious in backing them up.

The documentation which comes with the system lives in a fat three ring binder. This is one of those books in which all the information is contained between the two covers but it's a bit of a dig to find it. There is, for example, no index at all. The BASIC section has a reference guide and a tutorial but very little about how to actually do things, like manipulate tape files or write graphics programs. There is a decided lack of sample code.

There seems to be a lot of potential for expansion and fiddling in the system. It supports something called QL Net, which is a network of some sort. However, the manual is extremely vacant should one go trolling for technical information about anything not specifically related to the running of the system's software.

All of this allowed for, however, the QL is a moderately priced box with a lot to say for it. It's certainly a valid consideration if one is browsing through shelves of Commodores and Colour Computers, which is stacks up quite favourably to.

Of course, the QL's manual... like the computer itself... was done in Britain, so some of the words are a bit funny. The monetary examples are all in pounds, so the constants are actually variables. Unlike as in the case of the dollar, one does not have the expedient of appending "US" to a number to change this. The biblical quotations do give things a sense of permanence, though.

"In the beginning God created the heaven and the earth, and the earth was without form, and void, and darkness was upon the face of the deep.

And God said, let there be light, and Intel made the microprocessor. God immediately realized that He was dealing with a lost cause, and split for Andromeda to have another try." **CN!**

PC Slot Stuffer Survey

Fresh from the factory, the IBM PC and its faithful squadrons of clones and compatibles all tend to look alike, and, for the most part, be largely empty within.

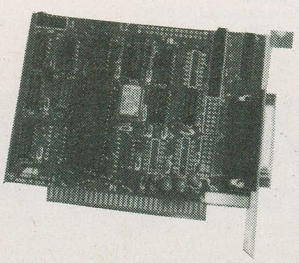
What's missing? It varies, of course, from machine to machine. The standard IBM PC comes with 256K memory, a monochrome display card, a floppy controller and either one or two drives. From there, you can load up on piles of standard peripherals: parallel, serial, clock, colour video, RAM, game port, or combinations of the lot. If we did a survey of every permutation of standard peripheral, we'd have to hire the Oxford Press to bind the issues, and some Charles Atlas graduates to deliver them.

Still, there are a number of cards in the marketplace which, through either bold technological advancement or simply in what their functions are, are worthy of notice. Some cards, though they accomplish standard functions, do their jobs particularly well. Other cards are practically unique in their field of endeavor... until their clones emerge from the labs.

Herein, we present our survey of interesting cards for the IBM PC. Please note that the listed distributors, for the most part, do business *only* with retail dealers and cannot answer technical or availability questions from end users. If your local dealer doesn't stock one of the listed cards, please have him contact the appropriate distributor.

ABM 5251 Emulator

Function: 5251 terminal emulator
Manufacturer: ABM
Distributor: EMJ Data Systems
Suggested Retail: $1400.00
Description: This card effectively turns an IBM PC into a 5251 terminal, a necessity when hooking into IBM Series 34, 36 or 38 minicomputers.

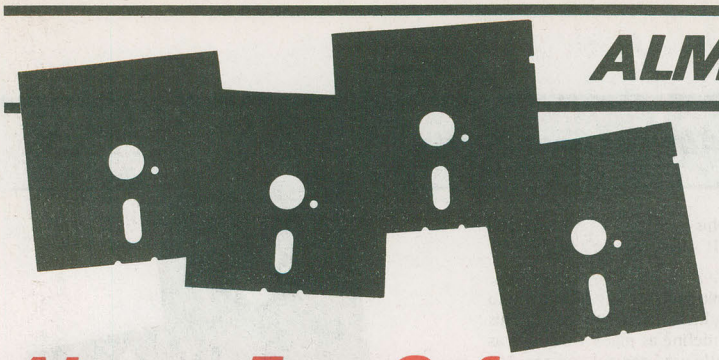


ABM 3270 Emulator

Function: 3270 terminal emulator
Manufacturer: ABM
Distributor: EMJ Data Systems
Suggested Retail: $1567.00
Description: A peripheral that eliminates the need for a cluster controller when interfacing a PC with an IBM mainframe.

Asher

Function: Communications management
Manufacturer: Quadram Corporation
Distributor: Chevco Computing
Suggested Retail: $1145.00 (300 baud); $1645.00 (1200 baud); 2400 baud version available shortly.
Description: A peripheral card that integrates the user's software with communications and telecommunications. Asher partitions the PC's memory so the user only has to load them (depending on installed RAM) all once. The user can then toggle between programs when they're called for. As well, the card ... with its built-in handset ... allows the user to exchange files or send/receive individual screens of information through the phone line. Asher also allows simultaneous voice and data transmission. The peripheral also comes with an electronic calendar and card file.



ALMOST FREE SOFTWARE CATALOGUE

Moorshead Publications

Almost Free Software

Almost Free Software (CP/M) .....#1

Almost Free Software #1, #2 and #3 are for CP/M and are available in a variety of formats: Apple // + CP/M, 8 inch SSSD*, Access Matrix, Morrow Micro Decision, Superbrain, Xerox/Cromemco*, Epson QX-10VD, Sanyo MBC 1000, Nelma Persona, Kaypro II, Osborne and double densities, Televideo, DEC VT-180, Casio FP-1000, Zorba.

Modem 7. Allows you to communicate with any CP/M based system and download files. Complete details were in Computing Now! November 1983.

PACMAN. You can actually play PACMAN without graphics, and it works pretty fast.

FORTH. A complete up-to-date version of FIG FORTH, complete with its own internal DOS.

DUU. The ultimate disk utility allowing you to recover accidentally erased disk files, fix gorched files, rebuild and modify your system. A real gem.

D. A sorted directory program that tells you how big your files are and how much space is left on the disk.

USQ/SQ. Lets you compress and uncompress files. You can pack about 40% more stuff on a disk with this system.

Finance. A fairly sophisticated financial package written in easily understandable, modifiable Microsoft BASIC.

BADLIM. Ever had to throw out a disk with a single bad sector? This isolates bad sectors into an invisible file, making the rest of the disk useable.

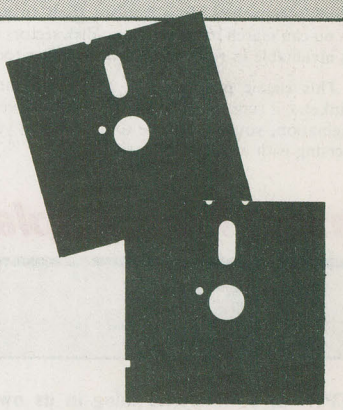
DISK. Allows you to move whole masses of files from disk to disk without having to do every one by hand, you can also view and erase files with little typing.

QUEST. A "Dungeons and Dragons" type game.

STOCKS. This is a complete stock management program in BASIC.

SEE. Also known as TYPE17, will TYPE any file, squeezed for not allowing you to keep documents in compressed form while still being able to read them.

Order as AFS #1, and specify system



$19.95 each

Except for 8" disks and those with two disks which are marked with an asterisk (*) above which are:

$22.95

*single density formats require two disks. The package cost for these formats is $22.95.

Almost Free Software (CP/M) .....#2

BISHOW The ultimate file typer, BISHOW version 3.1 will type squeezed or unsqueezed files and allow you to type files which are in libraries (see LU, below). However, it also pages in both directions, so if you miss something, you can back up and see it again.

LU Every CP/M file takes up unneccessary overhead. If you want to store lots of ata in a small space, you'll want LU, the library utility. It permits any number of individual files to be stored in one big file and cracked apart again.

MORTGAGE This is a very fancy mortgage amortization program which will produce a variety of amortization tables.

NSBASIC Large disk BASIC packages, such as MBASIC, are great . . . and very expensive. This one, however, is free . . . and every bit as powerful as many commercial programs. It's compatible with North Star BASIC, so you'll have no problem finding a manual for it.

RACQUEL Everyone should have one printer picture in their disk collection.

Z80ASM This is a complete assembler package which uses true Zilog Z80 mnemonics. It has a rich vocabulary of pseudo-ops and will allow you to use the full power of your Z80 based machine . . . much of which can't be handled by ASM or MAC.

VFILE Easily the ultimate disk utility, VFILE shows you a full screen presentation of what's on your disk and allows you to mass move and delete files using a two dimensional cursor. It has heaps of features, a built-in help file and works extremely fast.

ROMAN This is a silly little program which figures out Roman numerals for you. However, silly programs are so much fun . . .

CATCHUM If you like the fast pace and incredible realism of Pacman, you'll go quietly insane over Catchum . . . which plays basically the same game using ASCII characters. Watch little "C"'s gobble periods while you try to avoid the delay "A's" . . . it's a scream.

Order as AFS #2 and specify system

$19.95 each

Except for 8" disks and those with two disks which are marked with an asterisk (*) above which are:

$22.95

*single density formats require two disks. The package cost for these formats is $22.95.

Almost Free Software (CP/M) .....#3

OIL. This is an interesting simulation of the workings of the oil industry. It can be approached as either a game or a fairly sophisticated model.

CHESS. This program really does play a mean game of chess. It has an on-screen display of the board, a choice of colours and selectable levels of look ahead.

DEBUG. The DDT debugger is good but this offers heaps of facilities that DDT can't and does symbolic debugging... it's almost like being able to step, trace and disasemble through your source listing.

DU87. The older DUU program does have some limitations. The version overcomes them all and adds some valuable capacities. It will adapt itself to any system. You can search map and dump disk sectors or files. It's invaluable in recovering damaged files too.

ELIZA. This classic program is a micro computer head shrinker... it runs under MBASIC, and with very little imagination, you will be able to believe that you are conversing with a real psychiatrist.

LADDER. This is... this program is weird. It's Donkey Kong in ASCII. It's fast, bizarre and good for hours of eye strain.

QUIKKEY. Programmable function keys allow you to hit one key to issue a multicharacter command. This tiny utility allows you to define as many functions as you want using infrequently used control codes and to change them at any time... even from within another program.

RESOURCE. While a debugger will allow you to disassemble small bits of code easily enough, only a true text based disassembler can take a COM file and make source out of it again. This is one of the best ones available.

Order as AFS #3 and specify system

$19.95 each

Except for 8" disks and those with two disks which are marked with an asterisk (*) above which are:

$22.95

*single density formats require two disks. The package cost for these formats is $22.95.

Almost Free Apple DOS Software

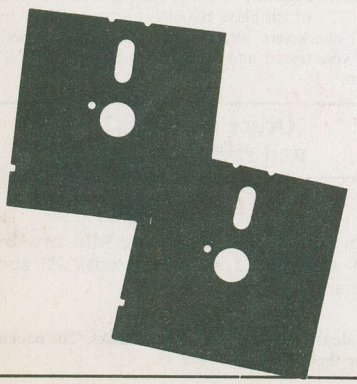
Almost Free Apple DOS Software ....#1

While CP/M is a wonderful thing in its own right, the Apple computer can also, and usually does, operate under DOS. For this reason, there's a multitude of programs available for it. Below, we offer a mini-multitude of our own.

The following programs will operate on any Apple //+, //e, //c, or true compatible operating under DOS 3.3. Apple users operating only under ProDOS may have to make alterations to some programs.

Picture Coder: All Apple HiRes pictures take up 36 sectors in their binary form. This program creates a textfile of a program in memory, squeezing out the zero bytes, that can later be EXECd into memory. The textfile often takes up less room on the disk.

DNA Tutorial: Operating under Integer BASIC, this program might appeal to 'clone' owners. In actuality, though, it's an interactive low-res graphics tutorial of DNA in its inherent forms. And you thought your Apple was only good for games...



Toad: Speaking of games, this program is an Applesoft BASIC implementation of 'Frogger' that can be controlled with either a joystick or the keyboard. The user's high scores are saved to disk.

Function Plotter: A fairly extensive Applesoft BASIC program that takes any inputted function and plots it on the HiRes Screen.

Data Disk Formatter: Apple DOS disks need not be bootable to be useful. This binary program formats a disk without setting DOS on the tracks, conserving useful disk space.

BASIC Trace: A program for the advanced Applesoft programmer, this file, when EXECd, displays the hexadecimal locations of each Applesoft line number of a program in memory.

Gemini Utility: A word processor pre-boot for Gemini printer users, this BASIC program initialises the printer's font or pitch before you boot your word processer.

Payments: This BASIC program allows you to keep track of payments and credits to and from up to 100 accounts on a single disk. A sample account is included.

Databox: A small but useful database program in Applesoft BASIC. Sample files are included to get you started.

Nullspace Invaders: A quick BASIC HiRes game testing coordination and judgement as you manipulate a monolith through mysterious gates.

Fine Print: The majority of this software has been obtained from on-line public access sources, and is therefore believed to be in the public domain. Any remaining programs were written in-house. The prices of the disks defer the cost of collecting the programs, debugging them, reproducing and mailing them, plus the cost of the media they're supplied on. The software itself is offered without charge.

Moorshead Publications warrants that the software is readable, and if there are any defects in the medium, we will replace it free of charge. While considerable efforts has been made to ensure that the programs have been thoroughly debugged, we are unable to assist you in adapting them for your own applications.

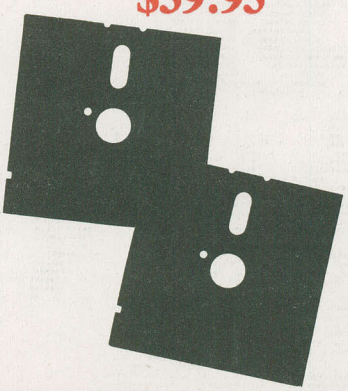
Order as AFAD #1 and specify system

Each disk is

$19.95

or, as an introductory offer you can order all three for

$39.95



Software Services Moorshead Publications

25 Overlea Boulevard, Suite 601, Toronto, Ontario M4H 1B1

Moorshead Publications

Almost Free Apple DOS Software ....#2

Amort: A monthly amortization program that calculates monthly payments to an inputted figure, calculates principle, interest on every balance, and prints out the resulting chart.

Voiceprint: An unusual program that uses the HiRes screen to sample sounds inputted through the cassette jacks at the back of your Apple. Sampling rate and other variables can be controlled, and two sounds may be compared side-by-side.

Calc NOW!: Written in BASIC, this spreadsheet program is somewhat slower than VisiCalc, but still offers the power you expect from a spreadsheet. With sample files.

Cavern Crusader: A mix of BASIC and binary programming, winning this HiRes game is difficult, to say the least. For every wave of aliens shot in the cavern, there's always a meaner bunch in the wings.

Newcout: With source file. This binary program replaces the I/O hooks in the Apple with its own so you can operate your Apple through the HiRes screen. Comes with a character set.

Charset Editor: A utility to help you create your own character sets to use with Newcout.

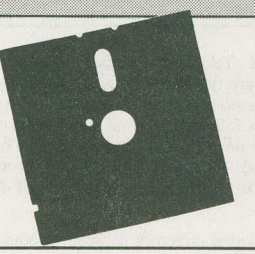
Calendar: A BASIC utility useful for finding a particular day of any inputted month and year, or for printing out any given year.

LCLODR: With source. This binary utility BLOADs any given file into the 16K language card space at $D000. The source is useful in showing how to use DOS commands through assembly language.

Cristo Rey: An animated HiRes BASIC program showing Cristo Rey by moonlight. For apartment--bound romantics.

ATOT: That's an acronym for 'Applesoft to Text'. EXEC this textfile to produce a textfile of your program.

Applesoft Deflator: This program takes a textfile made by ATOT and squeezes it, replacing PRINT statements with '?' and removing unnecessary spaces from the listing.



Order as AFAD #2 and specify system

Each disk is

$19.95

or, as an introductory offer you can order all three for

$39.95

Almost Free Apple DOS Software ....#3

General Ledger: A fairly massive BASIC General Ledger program. This program creates a number of files, so it's best put on a separate disk before implemented.

EE-Design: A shape design aid program written in BASIC. Allows the user to plot shapes in HiRes and either save them to disk or print them out.

Quickzap: A disk sector utility that reads a given track and sector into memory and allows you to alter it, and optionally write it back to disk.

Softgraph: A complete graphing program written in both Applesoft and binary that enables you to see your data done up professionally in pie, line or bar charts.

IntelliCalc: An intelligent calculator with three memories and a 'paper tape' readout. Data may be inserted at any point.

Poker!: An Applesoft BASIC implementation of the game that has ruined many a marriage. Fortunately, you can afford to lose your electronic paycheque to you Apple... for now.

Polar Graphics: Similar in some ways to Function Plotter, this Applesoft program supplies a number of attractive functions in REM statements that you may utilize to plot out on the HiRes screen.

Clock and Clock II: Two Applesoft digital clocks. When your Apple's doing nothing better, it can now remind you of the time you're wasting. One has an alarm function.

Flowers: With source. A binary program that prints a border of flowers to the HiRes screen. The source is invaluable in showing how to handle HiRes shapes in assembly language.

Convert Utility: A BASIC program that converts numbers between decimal, hexadecimal, binary and disk sectors.

ProDOSfix.TXT: Apple clone users who've purchased ProDOS will note that it doesn't work on their machines. This text tutorial explains why, and how to remedy the problem.

Order as AFAD #3 and specify system

Each disk is

$19.95

or, as an introductory offer you can order all three for

$39.95

Almost Free PC Software

Almost Free PC Software .....#1

Our Almost Free Software disks, volumes one through three, for systems running CP/M have been so thunderingly popular that we have assembled a volume for IBM PC users. The considerably greater power of a sixteen bit system, coupled with its larger capacity disk drives, have enabled us to offer a collection of programs that will knock the socks off virtually any sentient life form booting the disk. Be warned... wear sandals when you unwrap this thing.

This software will run superbly on genuine IBM PC's and compatible systems.

PC-WRITE While not quite Wordstar for nothing, this package comes extremely close to equalling the power of commercial word processors costing five or six bills. It has full screen editing, cursor movement with the cursor mover keypad, help screens and all the features of the expensive trolls.

SOLFE This is a small BASIC program that plays baroque music. While it has little practical use, it's just a kick to toodle with. It's also a fabulous tutorial on how to use BASICA's sound statements.

(continued overleaf)

(continued)

Almost Free PC Software .....#1

PC-TALK Telecommunications packages for the IBM PC are typically intricate, powerful and huge. This one is no exception. It has menus for everything and allows full control of all its parameters, even the really silly ones. It does file transfers in both ASCII dump and MODEM7/XMODEM protocols and comes with... get this... 119424 bytes of documentation.

SD This sorted directory program produces displays which are a lot more readable than those spewed out by typing DIR. It's essential to the continued maintenance of civilization as we know it.

FORTH This is a small FORTH in Microsoft BASIC. It's good if you want to get used to the ideas and concepts of FORTH... you can build on the primitives integral with the language.

LIFE This is an implementation of the classic ecology game written in 8088 assembler. While you may grow tired of watching the cells chewing on each other, in time the source will provide you with a powerful example of how to write code.

MAGDALEN This is another BASIC music program. We couldn't decide which of the two we've included here was the best trip, so we wound up putting them both on the disk. Ah... the joys of double sided drives.

CASHACC This is a fairly sophisticated cash acquisition and limited accounting package written in BASIC. It isn't exactly BPI, but it's a lot less expensive and suitable for use in most small business applications.

DATAFILE This is a simple data base manager written in... yes, trusty Microsoft BASIC.

UNWS Wordstar has this unusual propensity for setting the high order bits on some of the characters in the files it creates. Looks pretty weird when you try to do something other than Wordstar the file, doesn't it... Here's a utility to strip the bits and "unWordstar" the text. The assembler source for this one is provided.

HOST2 This is a package including the BASIC source and a DOC file to allow users with SmartModems to access their PC's remotely. It's a hacker's delight.

Moorshead Publications warrants that the software will be readable. If defects in the medium prevent this, we will replace your disk at no cost. While we have made every effort to assure that these programs are completely debugged, we are unable to assist you in adapting them for your application.

The disk also includes various support and documentation files needed to run the software.

We can provide the Almost Free PC Software Disk volume one on either one standard double sided disk or on two single sided ones.

Order as AFPC #1 and specify system.

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for two single sided disks.

Almost Free PC Software .....#2

A good program is like a good politician . . . no, wait, we've succeeded in finding some good programs. However, it did take a lot of searching. Presented here is a selection of some of the best utilities, games, programmers' tools and business applications ever to order the bytes on a disk.

Sweep is a turbocharged Ferrarri of a disk utility which makes the COPY command look like a goat herd by comparison. It allows one to do mass copying, deletion, renaming and other disk functions all in menu driven comfort. It supports essentially the same command structure and behavior as the CP/M Sweep and Disk programs.

Worldmap is a sophisticated graphics program which draws a very detailed picture of the planet we live on and daily endeavour to blow up. It will display its wares on the tube or send them out to a printer.

Anitra plays Anitra's Dance by Edvard Grieg. PC music programs are a gas . . . everyone should have a disk full of them.

Ramdisk is among the most useful of all the utilities you'll ever plug into your PC. It creates a virtual drive on your system out of memory. You can pop your files over to it when you boot the beast and thereafter experience disk accesses that take less time to complete than real drives take to turn on their LEDs.

Alien plays a bizarre adventure game. It leads you into some pretty warped places. It comes with a massive data file for an adventure that you won't get tired of 'til the dragons come home for the evening.

FOS is a personal financial manager which will, among other things, make your cheque books into servants of humanity as opposed to denizens of the aforementioned adventure game. It's thunderously slick.

Jukebox represents yet another PC music system. This one comes with a host of songs to play and some really electric graphics.

Asmgen is one of the best text disassemblers we've come across. It takes any executable COM or EXE file and produces an assembler listing. It's surprisingly good at distinguishing between code and imbedded data or text. If you have need to patch or modify code this thing will outdo DEBUG by light years.

Struct will appeal to the rabid programmer in everyone. It allows MASM to be used to assemble a sort of higher level language. Included also is a test file to illustrate the syntax.

Prtsc replaces the internal PC screen dump code with something more suited to reality. It allows one to hit the PrtSc* key and then select what the screen dump will look like from a menu. It supports a number of popular printers.

Breakout plays a PC version of the popular game. It will accept input from either a joystick or the keyboard. The graphics are good and the action is adjustable from a beginner's level right up to fast and nasty.

Util is a collection of system utilities all under one menu driven roof. Among its many talents are a sorted directory, keyboard redefinition and the facility for scrolling up and down through a text file.

All of this software is available on a single disk. It comes with extensive on disk documentation to explain how to make it do its things.

Only
$19.95
or $22.95
for two single sided disks.

Fine print:
There has to be fine print sooner or later, or the typesetting machine forgets how to do it. All of the software on the Almost Free PC Software Disk #1 has been obtained through public access bulletin boards and is believed to be in the public domain. Some of it is "freeware", and users will find messages imbedded in the code asking for donations on the part of the authors. This is between you and your conscience... hit RETURN and it usually goes away.

This software is offered free of charge. The cost of this package serves only to defer the cost of postage, handling and the disk itself.

Order as AFPC #2 and specify system.

Software Services Moorshead Publications

25 Overlea Boulevard, Suite 601, Toronto, Ontario M4H 1B1

Moorshead Publications

Almost Free PC Software .....#3

Without software even the slickest computer is nothing for more than a foot stool for dwarfs. With the high cost and general funkiness of commercial software being what it is you may be a bit loath to go pop for the expensive stuff. We can relate to this.

No one with any measureable amount of sense enjoys buying a pig in a poke for six hundred dollars knowing full well that its previous owner may not have been able to successfully identify which was the pig.

Almost Free software does away with a lot of the bad vibes inherent in buying software. It offers a rich variety of applications, it's devoid of copy protection and licencing agreements and it's so cheap that if even one of its applications proves useful to you it's well worth the twenty bucks.

This disk consists of some of the finest stuff we could find. We sorted through about four megabytes of software to compile it and, even if you were to allow for the countless hours it would take you to find it all and two keyboards with their control, alternate and delete keys worn clear through, it would cost you more than twenty bills in disks to duplicate.

Included on the disk are:

FIXWS. WordStar, the etherial Martian of word processors, has a propensity of leaving odd bits set in its files. This makes them look remarkably like high tech confetti if you type them or otherwise try to stick 'em in other applications. This program effectively turns them back into ASCII.

WRT. DOS 2.0 allows for each file to have a read only flag . . . although it lacks a way of manipulating them. This pair of utilities allows you to set and unset this flag, protecting important files from accidental erasure.

BROWSE. If you type a text file chances are that the part you want to see will scroll past you before you have a chance to see it, and you'll have to type it several times as a result. BROWSE allows you to scroll in both directions, much as you might if you were using a word processor.

CAT. If the DIR display is too dull for your tastes you obviously need CAT, which will tell you everything you could possibly want to know about the files on your disks.

CGCLOCK This is a simple little program which displays the running time in the upper right hand corner of your screen. However, it has lots of display options and works with the colour graphics card.

CURSOR. This program makes the cursor big. It's pointless, but it's only twenty four bytes long.

CMP. This program does a very elaborate comparison of two files and reports their differences. It can for example, spot corrupted files, and has a multitude of uses when dealing with files created by redirection.

JUMPJOE. A bit like Miner 2049'er, this game is certain to damage your mind. You get to be the janitor of a space station. Deal with berserk robots and other weirdnesses. It's a hoot.

CASTLE. This is unquestionably the best public domain we've ever come across . . . when we got it productive work stopped here for about two days. Wander around a deserted castle collecting treasures . . . but mind you don't get killed by the nasties. A solution is included should frustration set in.

78INT. This is a small BASIC program to calculate interest using the rule of seventy eight.

MOON. One of the nicest lunar lander games we've come across, this little beast uses high resolution colour graphics and decent sound effects to hurl you to your doom in style.

PERCHT. This is another serious BASIC program, this time to print Pert charts.

DATNOIDS. As games go, this one is highly strange. In fact, mere words don't serve to describe it . . . you'll have to try it for yourself.

NUKE-NY. This is one of the nastiest bits of software we've ever seen. It produces a full colour high resolution simulation of a nuclear attack on New York city. It's just the thing to give to paranoid people you don't like very much.

NUDE. Yes, it's a bit exploitive and probably in questionable taste, but it's just so well done. This program uses high resoltuion graphics to draw this chick with great . . . huge . . . pixels.

Also included on the disk is an extensive READ ME file which contains documentation for the programs.

The third volume of almost Free PC Software is available on a double sided disk in your choice of ten attractive colours . . . all of which are black . . . for a mere

Only

$19.95

or $22.95

for two single sided disks.

Order as AFPC #3
and specify system.

A Teacher for the Apple

Specifically developed for the educational market, this 5-1/4" disk introduces both teachers and students to the Apple+, IIe and compatible systems.

It is designed to show you how to make the computer work for you.

After introducing you to the computer, it goes on to explain the BASIC programming language and step-by-step instructions show you the ins-and-outs of programming this system and using its many features including disk operating systems and high resolution graphics.

This program is designed for the total novice and it is designed to work accordingly. All you do is turn the computer on, slide in the disk and it takes over!

Requires Applesoft BASIC, 48K RAM and one disk drive.

Available for: AppleDOS only

$35.00

Order as Teacher

DOSDIAL

The Apple Terminal Package

There are plenty of terminal programs for the Apple II and its emulators. Some dial, some download. However, only DOSDIAL is this splendidly cheap.

DOSDIAL is a hybrid Applesoft and machine code package for fast operation and easy modification. It features a phone number library and automatic dialing. It operates on any fruit with a PDA 232C serial card and an autodial modem. A complete source file of the assembler code is included to allow it to be quickly patched for other serial cards.

Will work on any Apple+ or compatible system with a PDA 232C serial card and an autodial modem.

Available for: Apple II+

$16.95

Order as DOSDIAL

Apple DOS Wunderdisk

Over the last few years . . . as the story goes . . . we've written a lot of programs for the Apple which we've published in Computing Now!. Most of them have taken a lot of work . . . they've all been thoroughly debugged.

Typing in programs . . . especially extensive ones, like Blort! in this issue . . . is a long, cold mouthful of tedium. As such, we've gathered together a collection of some of the best Apple code we've created, all on one disk. Enshrined here are some of the classics of the past.

You get DOSdial, the dialing terminal program, Clef Hanger, an Apple music box, Skyhook, a radio teletype converter, Fruit Crate, a small bulletin board system, MuGraph, an experimental sound program, Hashit, a sorting routine, JoyGraph, a graphics program and, of course, Blort!, as seen in this issue.

The whole works is just

Order as Apple DOS Wunderdisk

$16.95

MDM730

MDM730 is one of the most powerful MODEM7 programs availab[le] . . . and the Computing Now! version of MDM730 incorporates features not available in the public domain editions. If you are into telecommunications, bulletin boards and downloading software your life will be full and meaningful with this code. For background on MDM730, see July 1984 Computing Now!. Consider the facilities.

- Terminal program which works at any baud rate.
- Ten programmable macro function keys.
- Thirty six number phone library.
- Christensen software transfer protocol.
- User settable toggles for line feeds, ON-XOFF and so on.
- Extensive help menus.
- Baud rate selection on the fly (or the spider).
- ASCII dump and capture.
- Status menu
- Many more features.

In addition to all this splendor, however, we've added dialing support for the Apple version. While the standard MDM730 cannot dial unless it's hooked to a Hayes Smartmodem, we've added patches to it to allow it to do pin twenty five pulse dialling and to dial through the Hayes Micromodem II and the SSM card. The Computing Now! MDM730 will also

- Select a number from the library and dial it
- Accept a hand entered number and dial it
- Wait for carrier
- Log you onto the remote system if it's free
- Optionally autodial if the remote board is busy.
- Count the number of attempts at dialling the remote BBS.

The Computing Now! MDM730 package is available for

- The Hayes Micromodem II.
- The SSM 300 Baud modem card.
- The PDA 232C serial card with external modem.

The PDA 232C package includes versions supporting both the Smartmodem and a dumb modem with pin twenty five line control, such as the Novation AutoCat.

Also included with each package are utilities to permit easy alteration of the phone number library and the function key macro strings plus an extensive documentation file.

The source code file for this program is over a hundred and fifty kilobytes long. It cannot be hacked on a standard Apple. We patched it on a larger machine and downloaded it. As such, we're pretty sure that MDM730 with these features is unavailable elsewhere.

Available for: Apple][+ CP/M

Please specify modem version from above list.

$29.95

Order as MDM730

Apple Wordstar Fixer

Apples and Wordstar are not entirely friendly. Apple compatible systems equipped with Videx type eighty-column cards do a number of unpleasant things to this popular word processor. While there are simple cures for this... they all involve some delicate code hacking.

The Fixer solves this problem. Place it on the same disk as your copy of WS.COM, type FIXER and after a suitable amount of disk noise, you will have APWS.COM on there too. This version of Wordstar includes special patching and unhooking code which runs each time you boot Wordstar, and makes your fruit behave as it should. It releases the control K's, translates the left arrow key to a delete character, and patches Unitron keyboards.

In addition, the fixer allows you to set some of the defaults of Wordstar which the MicroPro INSTALL package doesn't really get to. All of these features are menu driven in English for absolute non-technical operation.

Will run in either 44K or 56K CP/M.

Available for: Apple II+ CP/M only.

$19.95 Order as Fixer

Gemini WordStar PRESS

The WordStar printing function is agonizingly slow. It's also not very obliging in regards to where it puts its page numbers and things like headers.

PRESS is a utility which handles the formatted printing of all sorts of text files, be they manuscripts, drafts, program listings . . . anything that you'd normally want printed out in page form. It installs the header of your choice at the top of each page and slaps the page number beside it.

It also gives you a running count of the number of characters, lines and pages having hit the printer as you go. It allows you to have your documents printed out in a variety of type size and style permutations, commensurate with the capabilities of your printer.

Most important, however, PRESS will send text to your printer, formatted and all, as fast as your printer can accept it. It will even adjust the high bits of WordStar files to avoid selecting the Sanskrit character set.

PRESS comes configured for the Gemini 10X and 15X printers. It will, in fact, be quite happy with most Epson compatible dot matrix printers. A version is also supplied for use with letter quality daisy wheel printers.

PRESS is a simple to use package which communicates with you in plain English.

Available: for CP/M

$19.95

Order as PRESS and specify system. See Almost Free Software (CP/M) for available systems.

Stockboy Inventory

When we first advertised this program, we would have been pleased with a fraction of the orders we received. On reflection we should have appreciated what a bargain it is. Inventory programs are generally pretty expensive and some of them are inflexible and some even badly engineered. You may find that even small inventories generate enrormous files.

Stockboy is a good, powerful, flexible bargain-priced package which will handle inventory for small businesses. We use Stockboy within Moorshead Publications for our own inventory control and it has stood the test of time.

Stockboy can:

- **Maintain an inventory database with current, maximum and minimum stock reporting when an item needs re-ordering.**
- **Be a point of sale terminal, adjusting the stock data base on line.**
- **Produce individual packing lists.**
- **Generate a customer list to be used in mass mailings.**
- **Run on any CP/M or MS-DOS based computer, even an Apple II running with a softcard.**

Stockboy is written in Microsoft BASIC, and is designed to be easily altered to suit your needs. It can be compiled using BASCOM if you desire. It is designed for use by non-technical operators.

Available for: CP/M and PC formats

$29.95 most systems

$34.95 for 8''

Order as Stockboy and Specify System

Steve's CP/M Wunderdisk! Volume the First

In the course of doing the last year or so of Computing Now! we've generated a lot of code. We've collected all the programs we've written... some of which have never been published in any of our magazines... and put 'em all on one disk. Included are things like STAR, the Gemini 10 printer setup, the Last Wordstar Unhook, CPMAP and the CP/M HOST program, complete with several unreleased support programs.

The Wunderdisk is the best collection of tricky CP/M routines on the planet, ideal for anyone who wants to get inside this powerful operating system and sing. It's also the best documented... the programs, for the most part, are written up in issues of Computing Now!

The Wunderdisk is available for: CP/M

$19.95

Order as Vol. First and specify system. See Almost Free Software (CP/M) for available systems.

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Electronic Symbols for the Macintosh

The most complex aspect of doing electronic schematics on the Mac is designing the symbols. Your fatbits will love you if you acquire a copy of our symbol set. These little trolls took us several eons to create, but, having done so they're a very well designed, complete set of circuit components.

The set includes two pages of symbols, one each for analog and digital circuitry. The former has capacitors, various resistors, diodes, silicon controlled rectifiers, thyristors, LEDs, rectifier bridges, transistors, a number of transducers, field effect devices, inductors and even vacuum tubes for those situations where you find yourself in a time warp. The digital sheet includes a complete set of logic devices and integrated circuits.

This package will be useful on any Macintosh computer having a hundred and twenty-eight K of RAM or more, an Imagewriter printer and the MacPaint application.

It costs

$29.95

Order as Mac-Circuits

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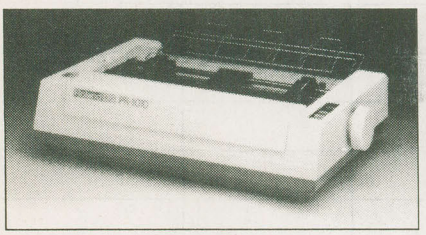

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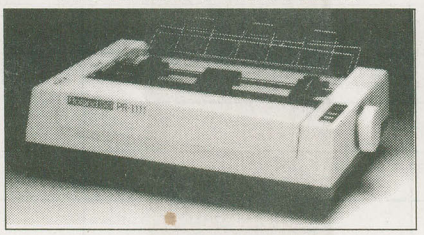

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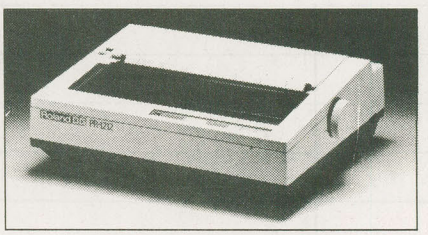

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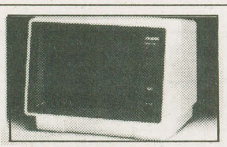

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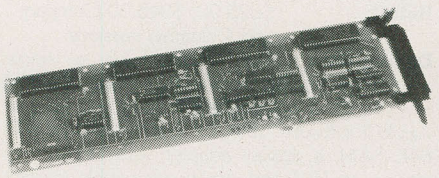
VISA MasterCard

Baseboard

Function: Industrial controller
Manufacturer: Tecmar Incorporated
Distributor: EMJ Data Systems
Suggested Retail: $550.00
Description: The Baseboard is a digital input/output board with 96 I/O lines.



BoB Super Display Adapter

Function: **Display adapter**
Manufacturer: Emulex Corporation
Distributor: J.B. Marketing
Suggested Retail: Starts at $900.00
Description: BoB, an acronym for 'Best of Both', is a high resolution colour display adapter supporting 800 by 400 pixels in alphanumeric mode with a 10 by 16 character cell. RAM-based character sets produced with Persyst Softset utilities may optionally be downloaded, or a factory designed ROM may be installed as a second ROM character set. The card provides the standard colour graphics resolution of 320/640 by 200 pixels, and optional expanded graphics capability of 320/640 by 400 pixels. BoB supports colour mode with 16 colours, or monochome mode with 16 shades of grey (dependent of monitor specifications). The peripheral provides a nonflickering display image and a lightpen interface.

Chauffeur

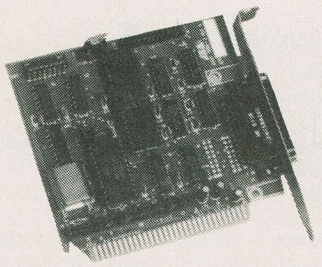
Function: Monochrome graphics
Manufacturer: STB Systems Incorporated
Distributor: Peripherals Plus
Suggested Retail: $690.00
Description: An extended monochrome card that doesn't require software drivers. Monochrome resolution is 640x200 pixels, and colours are displayed as shades of grey. A parallel port is standard, and a clock/calendar is optional.

COAX/3270

Function: Micro to mainframe
Manufacturer: Emulex Corporation
Distributor: J.B. Marketing
Suggested Retail: $1600.00
Description: A Persyst single-slot expansion board that, through software, facilitates incorporation of the IBM PC into virtually any IBM 3270 environment.

EM 7800S

Function: 7800 terminal emulator
Manufacturer: EMJ Data Systems
Distributor: EMJ Data Systems
Suggested Retail: $1195.00
Description: A peripheral card which emulates a 7800 terminal for connecting to Honeywell DPS4 or Level 62 computers.

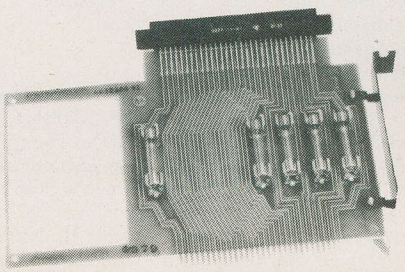


EPROM Programmer

Function: EPROM programmer
Manufacturer: Multiflex
Distributor: Exceltronix
Suggested Retail: $99.00 (standard sockets); $139.00 (ZIF)
Description: A card including one 24-pin and one 28-pin socket or optional zero insertion force (ZIF) sockets. The peripheral programs 2716, 2732, 2732a, 2764 and 27128 EPROMs. Options include a serial port and a external card for more convenient programming. Software is included.

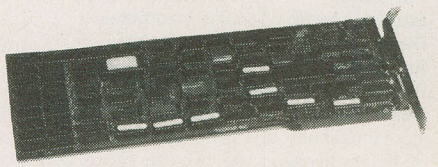
Extender Card

Function: Peripheral displacement
Manufacturer: Tecmar Incorporated
Distributor: EMJ Data Systems
Suggested Retail: $128.00
Description: The Extender Card ... with a built-in offset PC compatible slot ... plugs into any PC slot. Any peripheral introduced to the Extender Card's slot doesn't interfere with other peripherals, and is easily manipulated. Uses include industrial control and engineering applications, as well as peripheral card repair.



Graphics Master

Function: Monochrome/colour display
Manufacturer: Tecmar Incorporated
Distributor: EMJ Data Systems
Suggested Retail: $1108.00
Description: A display card which emulates both the IBM Color Graphics Adapter and the IBM Monochrome Adapter, thus allowing the user to run programs specifically written for either card. As well, the card is capable of displaying 640 by 400 pixels in 16 colours, and can display 720 by 700 pixels in high resolution monochrome mode. Driving software is included.

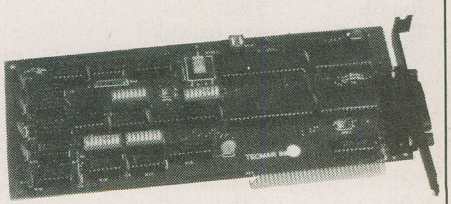


Hercules Graphics Card

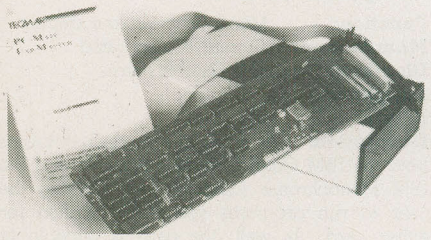
Function: Monochrome graphics display
Manufacturer: Hercules Computer Technology
Distributor: Compuserve
Suggested Retail: $775.00
Description: An extended monochrome card offering two 720x348 pixel pages of high resolution graphics. A two kilobyte RAM buffer is provided to eliminate scrolling flicker. The board comes standard with a parallel port and software.

IEEE-488 General Purpose Interface Bus

Function: Professional parallel interface
Manufacturer: Tecmar Incorporated
Distributor: EMJ Data Systems
Suggested Retail: $630.00
Description: A parallel card to facilitate interfacing the IBM PC with test equipment ... most notably Hewlett-Packard ... and anything else using the IEEE-488 standard.



PC Slot Stuffer Survey

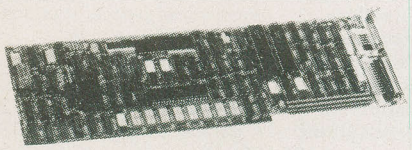


Lab Master

Function: Real world sampling/control
Manufacturer: Tecmar Incorporated
Distributor: EMJ Data Systems
Suggested Retail: $1586.00
Description: A professional peripheral offering 16 channels of 12-bit analogue to digital, a 30 KHz conversion rate, two channels of digital to analogue, five timer counters and three 8-bit parallel ports. The card also offers numerous options that allow programmable gain, up to 256 channels and a higher conversion rate. The card comes with software, and an extended software package is available.

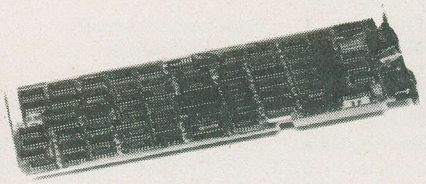
PC Memory + Clock

Function: Extended multifunction
Manufacturer: Emulex Corporation
Distributor: J.B. Marketing
Suggested Retail: $395.00 (0K); $895.00 (576K)
Description: A multifunction board offering 576K of memory with the convenience of split-memory addressing, a calendar/clock with a 5-year battery, and a unique software 'lock' to prevent unauthorised access to user files.



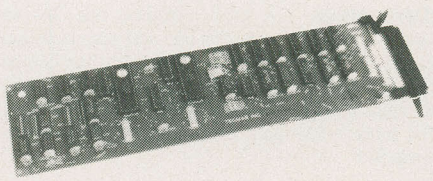
UltraPAK

Function: Monochrome video board
Manufacturer: Tseng Laboratories
Distributor: Compuserve
Suggested Retail: $1050.00
Description: An extended monochrome board that provides two pages of 720x348 pixels graphics on a monochome screen. Displays either 80 columns by 25 lines, or 132 columns by 44 lines. Provides colour graphics emulation. Comes with print spooling and RAM disk software. Standard ports are one parallel, one serial and a clock/calendar. Options are 384K RAM population, another serial port and a disk controller. 132x44 mode available under WordStar, MultiPlan, Word Perfect and Lotus 1-2-3 (with included driver).



STB Graphix Plus II

Function: Universal display adapter
Manufacturer: STB Systems Incorporated
Distributor: Peripherals Plus
Suggested Retail: $625.00
Description: A single board that supports both colour and monochrome displays. Graphics are supported in these modes with appropriate software: 16 colour 320x200, 4 colour 640x200 and 640x350 full-screen monochrome graphics. Lotus 1-2-3 software drivers are included for the 16 colour and full screen monochrome graphics modes. The card includes a printer interface. A clock/calendar feature is available.

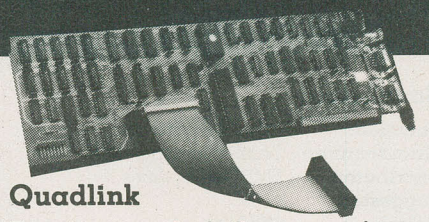


Stepper Motor Controller

Function: Stepper motor controller
Manufacturer: Tecmar Incorporated
Distributor: EMJ Data Systems
Suggested Retail: $790.00
Description: A peripheral capable of controlling two stepper motors, handling eight bits digital input and eight bits of digital output.

Real Colour Board

Function: Extended colour display
Manufacturer: Micro Design Systems
Distributor: PiXel Productions
Suggested Retail: $699.00
Description: The Real Colour Board allows the user to draw from a palette of 512 colours, of which 16 may be on-screen at once. The card was designed for the windowing environment and has NAPLPS applications. Video is RGB or composite, and the RGB may be digital or analogue. Driving software is included. During May, the available palette is expected to be increased to 2,000,000 colours.



Quadlink

Function: Apple Computer emulator
Manufacturer: Quadram Corporation
Distributor: Chevco Computing
Suggested Retail: $825.00; $845.00 Compaq and Columbia versions
Description: The Quadlink is a single plug-in co-processor board that enables the IBM PC and some compatibles to load and operate Apple][software. The card comes standard with 64K RAM, a display adapter with five display modes, an IBM and Apple compatible joystick port, a disk controller and software. Quadlink allows the use of all IBM enhancements ... such as printers ... while running Apple software.

Super Res 400

Function: Very high resolution colour
Manufacturer: STB Systems Incorporated
Distributor: Peripherals Plus
Suggested Retail: $960.00
Description: A colour display adapter that requires, in its higher resolution modes, a monitor of 25 KHz bandwidth or better. Resolutions are 16 colours at 320x200 pixels, 4 colours at 640x200 pixels and 2 colours at 640x400 pixels. A software driver is included.

3270 Cluster

Function: Multiple communications
Manufacturer: Emulex Corporation
Distributor: J.B. Marketing
Suggested Retail: Starts at: $1100.00 (DCP/88-VM) and $925.00 (MPC)
Description: Peripherals (DCP/88-VM and MPC controller) that allow the creation of remote Bisync or SNA 3270 environments. Four synchronous communications lines enable up to three stations to be daisy-chained to the unit. An extended software package is available.

Addresses: **Chevco Computing, 6581 Kitimat Road, Mississauga, Ontario L5N 2X5 (416) 821-7600 • Compuserve, 606 Hood Road, Markham, Ontario L3R 3K9 (416) 477-8088 • EMJ Data Systems Limited, 291 Woodlawn Road West #3, Guelph, Ontario N1H 7L6 (519) 837-2444 • Exceltronix, 319 College Street, Toronto, Ontario M5T 1S2 (416) 921-8941 • J.B. Marketing of Canada, P.O. Box 422, Cornwall, Ontario K6H 5T2 (613) 938-3333 • Peripherals Plus Incorporated, 1470 City Councillors, Montreal, Quebec H3A 2E5 (514) 281-1306 • PiXel Productions, 82 Peter Street, Suite 206, Toronto, Ontario M5V 2G5 (416) 591-9046**

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A: A *FREE* software disk... if you subscribe NOW!

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The Completely Free Software Disk is actually two disks in one. One side has a plethora of Apple DOS programs, and the other side is laden with IBM files. Blessed are the subscribers with access to both computers...

As its title implies, the Completely Free Software Disk is just that... **FREE**. However, it's only being offered to readers subscribing now or subscribers extending their present subscriptions, and only for a limited time. We regret that we'll be unable to supply the Completely Free Software Disk as a subscription bonus to orders postdated after **June 1, 1985,** so please subscribe or extend your subscription today to avoid disappointment.

Side One: Apple DOS files

Apple Binary Encryption and Apple Binary Decryption, with source files: Programs to keep peering eyes from your valuable data. See the article in the February 1985 issue of CN!.

Racquel.Pic: An Apple HiRes implementation of the CP/M teletype drawing offered in Almost Free Software Volume II.

HGR Dump: A BASIC editor that lets you preselect options before sending your HiRes picture to the printer. Written for a Dumpling-GX card, but easily modified.

HGR Invert: A fast binary program that displays the 'negative' of any HiRes picture in memory. BRUNning it again restores the picture.

Magfiler: A magazine article database in Applesoft BASIC. The February issue of CN! has already been entered to get you started.

Miniature Golf: A binary HiRes game of golf, with a truly wicked course. The sixth hole's a dandy.

Memtest: This short, two-sector binary program comes in handy when your Apple starts to hiccough. It writes and reads to memory from $0800 to $BFFF. Three passes and your RAM's in fine shape.

Forced Read, with source: A short binary program originally appearing in Electronics Today, this program has incredible error handling.

APCP/M: A handy utility for the Applesoft user who also dabbles in CP/M, this program will read a text file up to 16K in length from an Apple CP/M disk and write it to a DOS disk. Known affectionately as 'Reverse APDOS'.

DM II: From the Apple User Group of Sweden comes forth this DOS modifying program that allows you to change commands, error messages, catalog headers and volumes, and even fiddle with DOS entry points.

Star Patrol: An Applesoft implementation of the HiRes ADAM program appearing in the February edition of CN!. Your mission is to shoot elusive space bats.

Attenuators: An Applesoft BASIC program to aid calculating resistance and loss.

Capacitors: A similarly Applesoft BASIC program to help calculate capacitance and frequency response.

Side Two: IBM files

SD: An acronym for Sorted Directory, this program produces a more visually appealing directory than can be had from the MS-DOS DIR command.

FORTH: A small BASIC implementation of FORTH. You can expand the primitives or add new ones as they become necessary.

Datafile: Everyone needs a database manager. This one's written in Microsoft BASIC.

Blueterm, with source: A terminal program for the PC. Suggested hardware requirements include a modem...

Poker!: A BASIC program pitting you against your PC. Where's that straight flush when you need it?

Bandit: An alternative to that Las Vegas trip you've been planning. Appearing in the June issue of CN!, this BASIC program simulates a one-armed bandit.

CalcNOW!: A spreadsheet program written in BASIC. While very good at what it does, we don't expect Lotus to be nervous.

Cashacc: Written in BASIC, this is a cash acquisition and limited accounting package for the PC.

UnWS, with source: When you TYPE a WordStar file, you usually get garbage. This program strips the high bits from the WS file of your choice to make it legible again.

Note: Neither the Apple nor the IBM disk sides are bootable. Both Apple DOS 3.3 and MS-DOS are copyrighted disk operating systems, property of (respectively) Apple Computers Incorporated and Microsoft Corporation. In order to read the files on the Completely Free Software Disk, first boot a disk with either DOS 3.3 or MS-DOS on it, then either CATALOG or DIR the side that's relevant to your machine. From this point, you'll be able to run the applications programs, though it's suggested that you copy the files onto another disk.

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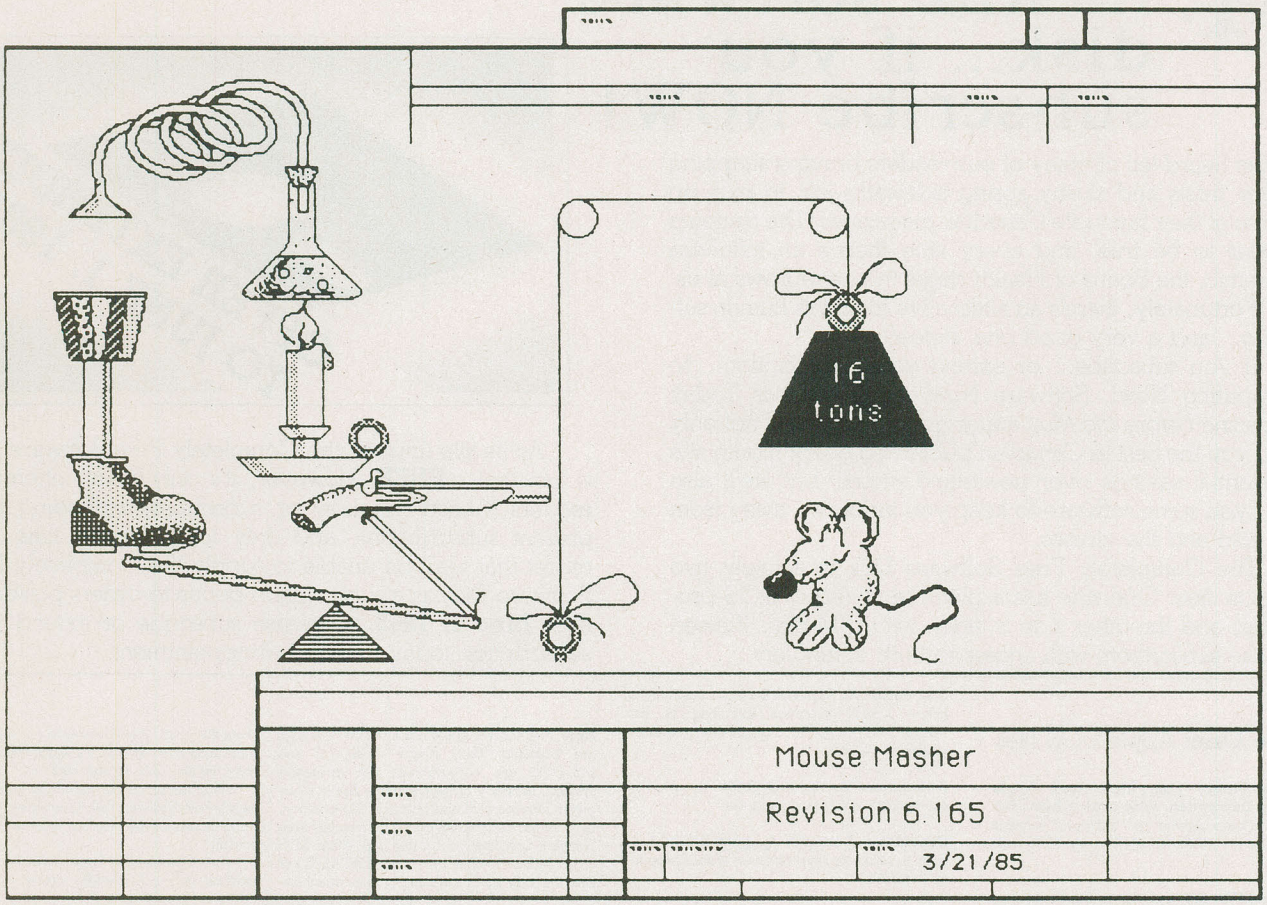
A Better Morse Trap for the Apple



In the continuing quest for alternate things to feed into an Apple... most people never think of plugging them into radios. 'Tis a shame. This program will allow you to read Morse code transmissions on the screen of your fruit.

by Jim Dawson

When Samuel Morse built his first Morse telegraph machine inside a picture frame, high tech hit the nineteenth century... but we should remember that he had never heard of a microprocessor. This program for the Apple family brings things a bit more up to date.

Morse's first receiving machine... whose springs, pulleys, wires and levers might well have inspired Rube Goldberg later on in the century... was essentially a simple device. An electromagnet moved a pencil over a strip of paper which itself moved over a drum. The undulating line produced by incoming signals could then be read and converted manually into alphanumeric characters.

Life was simpler then. People had time on their hands for this sort of thing. Today we expect messages to leap out us ready to read with little or no effort on our part. Perhaps if we combine this program with the power of the Echo II or the Sweetalker we could skip the reading part altogether, but let's do one thing at a time.

Bait

Morse had a somewhat easier time of things than we do today in radio communications. He had only to deal with a pure logic state... a signal was there or it wasn't. Pure logic states are about as easy to come by in the field of radio telecommunications as they are in the House of Commons. Morse did not, for instance, have to deal with interfering signals from other stations, electrical noise... such as static produced by lightning or interference caused by motors or electric fences... or fading of signals. And since he did not concern himself with demodulating audio tones... more on this later... he wasn't worried in the slightest about a momentary drop out of a signal.

We might guess that receiver stability meant no more to Samuel than making sure the cat couldn't knock over his picture frame too easily.

Before reading any further, you might want to take stock. If you are going to be able to use this program you will need an Apple II+ at least or a compatible machine, a communications grade radio receiver which is very stable after warm up and you will need at least half of a rather special modem, this being the demodulator featured elsewhere in this issue. The first important consideration in making Morse code turn up on the screen as ASCII is defining exactly what it is... in terms that will make sense to a fruit. In the best of all possible worlds, the elements of a Morse code character exist peaceably in a fairly precise relationship with each other. If we take the basic element as a *dit* and

deem it to occupy a period of time, T, the following illustrates the ideal relative values of the other elements.

Dit	**T**
Dah	**3T**
Element Space	**T**
Letter Space	**3T**
Word Space	**7T**

If we shorten each of the elements while maintaining the timing ratios shown in this table, it is clearly possible to send more characters in a given period of time. Code speed, usually defined as being the number of words sent in a minute, can be increased or decreased at will.

On the amateur bands we find a range of from five words per minute to up to sixty, the latter being machine code, Morse which can only be decoded by a computer. The vast majority of hams... amateur operators... tend to send at speeds of twenty to forty words per minute. Commercial stations fall in the range of fifteen to thirty.

The main program. See the table for the position of the elements at TAB.

```
*********************************
*                               *
*     A BETTER MORSE TRAP       *
*                               *
*       MORSE DECODER           *
*                               *
*   (C) 1985 JIM DAWSON         *
*                               *
*          VE2DYA               *
*                               *
*********************************
        ORG  $7000
CLS     EQU  $FC58
PRINT   EQU  $FDED
C/R     EQU  $FD8E
BUFF    EQU  $80
DIMAX   EQU  $81
DAMAX   EQU  $82
CTR     EQU  $83
*
*
*
*
*
        LDA  #$00
        STA  $84
        LDA  #$3A
        STA  DIMAX
        JSR  CLS
        CLC
        BCC  START
****************************************
*   ASCII CHARACTERS FOR LOOKUP TABLE  *
****************************************
TAB     ASC        "* ETIANMSURWDKGOHVF L PJBXCYZQ +"
        ASC  "54       3   2+ %    16=/     "
        ASC  "7          8 90     @      ?   "
        ASC  "                                ;        ,"
        ASC  "              : '"
START   LDA  #01
        STA  BUFF
        ASL  BUFF
        LDA  #00
        STA  CTR
        JSR  SLOFAS
        JMP  NEXT
****************************************
*  KEYBOARD ADJUSTMENT OF SPEED  *
*  SUBROUTINE USING + OR - KEYS  *
*  WHILE PROGRAM IS RUNNING....  *
****************************************
SLOFAS  LDA  $C000     ;KEY HIT?
        STA  $C010     ;THERE MAY BE MORE - CLEAR STROBE
        BMI  CHECK     ;SEE WHAT IT WAS THEN
OUT     LDA  $C061
        CMP  #$80
        BPL  SLOFAS
        RTS
CHECK   SEC            ;WHAT KEY WAS IT?
        CMP  #$AE      ;BIGGER THAN '-'?
        BCC  AGAIN     ;LET'S LOOK INTO THIS
        JMP  OUT       ;FORGET IT!
        CLC            ; THERE'S ANOTHER POSSIBILITY - CHECK IT.
        CMP  #$AE
        BCS  OUT       ;NO INTEREST
AGAIN   CLC            ;LOOK FOR A '+' OR '-'
        CMP  #$AB
        BCC  OUT       ;NO POINT IN STAYING AROUND
        CMP  #$AC
        BCC  FAS
SLO     INC  $81 ;LET'S SLOW DOWN
        JSR  $FDED     ;SHOW WHAT YOU DID ON SCREEN
        JMP  OUT
FAS     LDA  $81
        CLC
        CMP  #$04      ;MINIMUM LENGTH OF DIMAX
        BCC  OUT       ;THAT'S FAST ENOUGH!
        DEC  $81       ;LET'S SPEED UP A BIT
        LDA  #$AB
        JSR  $FDED     ;SO PRINT IT, OK.
        JMP  OUT
****************************************
*   MAIN TIMER SUBROUTINE HERE   *
****************************************
TIMER   LDX  #$01      ;1 MS TIME LOOP
XLOOP   LDY  #200
YLOOP   DEY
        BNE  YLOOP
        DEX
        BNE  XLOOP
        RTS
****************************************
*    MAIN PROGRAM STARTS HERE    *
****************************************
NEXT    JSR  SLOFAS
        LDA  #$01
        STA  CTR
        JSR  TIMER
        BIT  $C061     ;EL. STILL THERE?
        BPL  CONT
        JMP  NEXT
CONT    LDX  #$00
        STX  $84
        JSR  TIMER     ; IT'S AT LEAST A DIT
THERE1  INC  CTR       ;DO A 'DIT' LOOP AND
        JSR  TIMER     ;ALLOW FOR ESCAPE IF
        BIT  $C061     ;THE 'DIT' IS SHORTER
*         ;THAN EXPECTED!
        BMI  DIT
        LDX  $84
        INX
        STX  $84
        CLC
        CPX  DIMAX
        BNE  THERE1
TEST    LDA  $81       ;TEST FOR A 'LONG DIT'
        JSR  $FCA8     ;MONITOR DELAY HERE
        BIT  $C061     ;ALLOW FOR BREAKOUT
        BMI  DIT        ;IF 'DIT' TOO LONG
        JMP  DAH       ;IT WAS A 'DAH' WE HEARD
        LDA  $81       ;LONG DIT? OR WAS IT
        JSR  $FCA8     ;A SHORT DAH.  CHECK!
        LDA  $81
        JSR  $FCA8
        BIT  $C061
        BMI  DIT
        JMP  DAH
DIT     ASL  BUFF
        JMP  HOLDIT
DAH     LDA  #$01
        CLC
        ADC  BUFF
        STA  BUFF
        ASL  BUFF
HOLDIT  BIT  $C061     ;LET THE ELEMENT FINISH
        BPL  HOLDIT    ;BEFORE WE GO ON SO
*          ;WAIT HERE A WHILE, OK?
        LDA  #$00
        STA  CTR
****************************************
* CHECK FOR ELEMENT SPACE, LETTER SPACE *
* OR A WORD SPACE IN THE NEXT ROUTINES  *
****************************************
```

A Better Morse Trap for the Apple

```
ALOOP   INC  CTR       ;HERE IS A SPACE BUT
        LDA  DIMAX     ;IS IT AN ELEMENT SPACE
        CLC            ;OR A LETTER SPACE OR
        CMP  CTR       ;A WORD SPACE!
        BCC  GO2       ;LET'S FIND OUT NOW!
        BIT  $C061
        BPL  BK1       ;THAT WAS AN EL. SPACE!
        JSR  TIMER     ;NO?  LET'S SEE THEN.
        JMP  ALOOP     ;STAY IN LOOP FOR A 'DIT' LENGTH
BK1     LDA  #$00
        STA  CTR
        JMP  NEXT      ;GET ANOTHER ELEMENT
GO2     LDA  #$00
        STA  CTR
BLOOP   INC  CTR       ;TRY ANOTHER 'DIT' LOOP
        BIT  $C061     ;ALLOW FOR BREAKOUT THOUGH
        BPL  BK1       ;IF NEXT ELEMENT COMES ALONG
        LDA  DIMAX
        CLC
        CMP  CTR
        BCC  BK
        JSR  TIMER
        JMP  BLOOP
*************************************
*  OUTPUT ROUTINE FOLLOWS HERE   *
*************************************
BK      LDA  BUFF      ;PRINT LETTER IN BUFFER
        LSR  A
        TAY
        LDA  TAB,Y       ;LOOK UP CHARACTER IN TABLE
        JSR  $FDED     ;PRINT IT!
        LDA  #$15      ;EMPIRICAL VALUE!
        STA  CTR       ;CONTROLS NUMBER OF TIMES
        LDX  CTR       ;WE GO THROUGH LOOP
CLOOP   STX  CTR       ;TO CHECK FOR LETTER
        BIT  $C061     ;SPACE OR WORD SPACE BUT
        BPL  QUIT      ;ALLOW FOR BREAKOUT!
        LDA  DIMAX     ;CONTROLS MONITOR DELAY
        JSR  $FCA8     ;IN THIS MON. ROUTINE
        LDX  CTR
        DEX
        BNE  CLOOP
BK2     LDA  #$A0      ;LOADS ASCII 'SPACE'
        JSR  $FDED     ;PRINTS A SPACE
QUIT    LDA  #$01      ;GET READY FOR NEXT
        STA  BUFF      ;CHARACTER TO COME
        ASL  BUFF      ;ALONG! BUT FOR PETE'S
        JMP  NEXT      ;HURRY UP!

*** SUCCESSFUL ASSEMBLY: NO ERRORS
```

Fortunately, for the purposes of this discussion, the Apple's designers provided a way for us to get at the innards of the Apple II family of machines via the game port. If we can provide a TTL logic signal to send to this we have the beginnings of a decoding program which is ever so slightly better than Morse's pencil stub. We don't need a moving strip of paper, we don't need to sharpen the pencil, and, best of all, the letters come out ready-made.

This part of getting Morse into the Apple is easy. The next bit gets a bit trickier. The problem is to determine whether an element being received is a *dit* or a *dah*. Since all things are relative, it is clear that what can be a *dit* in copying a given station can equally well be a *dah* in copying faster code. An initial value for the basic *dit* length is calculated by the basic driving program or furnished by a default value in the program and stored in location $81 in memory. The operator's guesstimate of the speed of the incoming code starts... metaphorically... the ball rolling. The guesstimate will provide a value which the operator can adjust while the program is running by using the plus and minus keys keys until solid copy appears on the screen.

Once an element has been detected... and once the program is satisfied that the element is not merely a stray noise pulse... a time loop is entered which is nominally one *dit* in length. Since a dit may terminate early for a number of reasons, provision must be made for dropping out of the loop and storing the *dit* as a binary zero in the buffer. If, though, at the end of the nominal *dit* length of time, a signal is still present at $C061, the element being received is most likely a *dah*. If, of course, the signal was not a *dah* it had to be a *dit*.

There is a possibility that a signal which is still there at the end of the dit *length timing loop is in fact, a dit*, however, albeit a slightly long one. Provision is made to drop out of the second *dit* length loop should the signal terminate before the nominal *dit* length of the loop has expired. In this case, the program decides that the element was a *dit* and files it accordingly. Should the loop complete, though, we are definitely dealing with a *dah* and a binary one is filed in the buffer. The program then moves to a delay loop which allows the element to complete itself.

The BASIC driver

```
100 HT = 37
110  HOME
120  HTAB 10: VTAB 5: INVERSE : PRINT
     "  A BETTER MORSE TRAP  ": NORMAL

130  VTAB 8: HTAB 16: PRINT "MORS
     E READER"
140  VTAB 10: HTAB 21: PRINT "BY"

150  VTAB 12: HTAB 17: PRINT "JIM
      DAWSON"
160  VTAB 14: HTAB 19: PRINT "VE2
     DYA"
170  FOR I = 1 TO 3000: NEXT
180  VTAB 20
190  INVERSE : PRINT "IF YOU HAVE
     N'T YET DONE SO, STOP NOW AN
     D   TYPE 'BLOAD CW.O' THEN P
     RESS RETURN  ": NORMAL : PRINT
     ""
200  PRINT "   THEN RUN THIS BASI
     C PROGRAM AGAIN!"
210  GET A$
220  HOME
230  VTAB 10: HTAB 1: PRINT "ENTE
     R APPROXIMATE CW SPEED (WPM)
     --> ";
240  VTAB 20: HTAB 1: PRINT "PRES
     S RETURN WHEN YOU HAVE FINIS
     HED..."
250  GOSUB 260: GOTO 230
260  VTAB 10: HTAB HT: GET A$
270  IF A$ =  CHR$ (13) THEN  POP
     : GOTO 320
280  IF A$ < "0" OR A$ > "9" THEN
     260
290 SPEED$ = SPEED$ + A$: VTAB 10
     : HTAB 37: PRINT SPEED$
300 HT = HT + 1
310  RETURN
320  HOME : VTAB 07: HTAB 15: PRINT
     "SPEED = ";SPEED$;" WPM"
330  VTAB 10: HTAB 12: PRINT "IS
```

```
      THIS CORRECT? (Y/N) ";: GET
      A$
340   IF A$ < > "Y" THEN  HOME :S
      PEED$ = "": GOTO 230
350 V =  VAL (SPEED$): GOSUB 380
360   POKE 129,V
370   CALL 28672
380   IF V =  > 60 THEN V = 10: RETURN

390   IF V =  > 50 THEN V = 15: RETURN

400   IF V =  > 40 THEN V = 20: RETURN

410   IF V =  > 30 THEN V = 30: RETURN

420   IF V =  > 20 THEN V = 40: RETURN

430   IF V =  > 10 THEN V = 55: RETURN

440   IF V =  > 5 THEN V = 75: RETURN
```

Spaces

Lookup tables are all very well, but before they can be used, there has to be a way for the program to determine if the space it is observing at the end of an element is a space between elements, a space between letters, or a space between words. In the first instance it must go back and get the next element as quickly as possible.

It is ironic in this instance that the program cannot determine if it was dealing with an element space until, in fact, that space no longer exists. Another element must have arrived, in fact, and the space between it and the previous element must have been about one *dit* timing period in length. In the real world of radio telecommunications these things can only be approximate and departures from the ideal are the norm rather than the exception. Let's say that the next element arrived prior to the expiration of two timing periods each one *dit* long. In this case the program would decide that he space was an element space.

If, though, at least two such *dit* length timing periods go by and no new element has appeared, we must be dealing with either a letter space or a word space. More than three such time periods will likely indicate a word space although the total number of timing periods should be anything from twenty–one to almost anything. It depends on when the other fellow has collected his thoughts enough to get on with the next word.

By using the shift to the right principle to create the actual index, the length of the lookup table is limited to a reasonable hundred and twenty places. Since the listing of the program does not show at all clearly the relative locations of the ASCII values stored in the lookup table, the table itself is reproduced separately.

Running the Program

A default value for the expected code speed has been provided in the program and is stored in DIMAX in location $81. The default value is for relatively slow code. If you are listening to a demodulated signal from a station sending more than twelve words per minute, you will need to tap the plus key several times.

Both of the commercial programs I own have rather delicately worded disclaimers of sorts buried in their printed matter somewhere. I feel in all modesty that same sort of disclaimer should appear here. No computer program in the world... notice that I am not being delicate at all... is as good as the human brain at decoding Morse off the air. Let it be said in all fairness, though, that no human can work as fast at decoding Morse as these few bytes.

0 *	1 NUL	2 E	3 T	4 I	5 A	6 N	7 M								
8 S	9 U	10 R	11 W	12 D	13 K	14 G	15 O								
16 H	17 V	18 F	19 NUL	20 L	21 NUL	22 P	23 J								
24 B	25 X	26 C	27 Y	28 Z	29 Q	30 NUL	31 +								
32 5	33 4	34 NUL	35 3	36 NUL	37 NUL	38 NUL	39 2								
40 +	41 NUL	42 %	43 NUL	44 NUL	45 NUL	46 NUL	47 1								
48 6	49 =	50 /	51 NUL	52 NUL	53 NUL	54 NUL	55 NUL								
56 7	57 NUL	58 NUL	59 NUL	60 8	61 NUL	62 9	63 0								
64 NUL	65 NUL	66 NUL	67 NUL	68 NUL	69 @	70 NUL	71 NUL								
72 NUL	73 NUL	74 NUL	75 NUL	76 ?	77 NUL	78 NUL	79 NUL								
80 NUL	81 NUL	82 NUL	83 NUL	84 NUL	85 .	86 NUL	87 NUL								
88 NUL	89 NUL	90 NUL	91 NUL	92 NUL	93 NUL	94 NUL	95 NUL								
96 NUL	97 NUL	98 NUL	99 NUL	100 NUL	101 NUL	102 NUL	103 NUL								
104 NUL	105 NUL	106 ;	107 NUL	108 NUL	109 NUL	110 NUL	111 NUL								
112 NUL	113 NUL	114 NUL	115 ,	116 NUL	117 NUL	118 NUL	119 NUL								
120 :	121 NUL														

This table illustrates the actual relationship of the translation table elements.

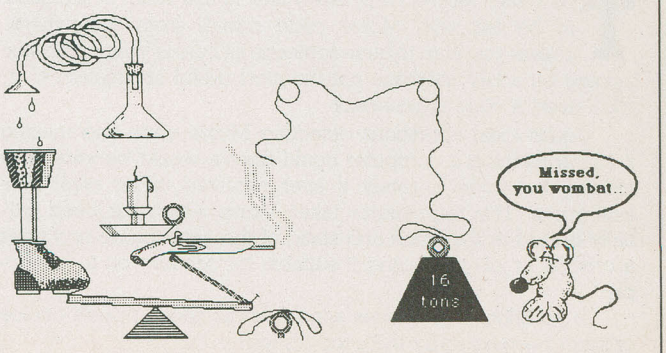
The next disclaimer is that no electronic filter is quite as good as grey stuff at excluding extraneous signals. Noise has a way of getting through and of wreaking havoc at times on otherwise good copy.

The third disclaimer, this one on behalf of people, is that we mortals do not send perfect code. Our spacing is faulty. We run letters or words together. We speed up or we slow down. We actually make mistakes in sending what we think we have sent. The result is that from time to time some slightly weird things will appear on the screen.

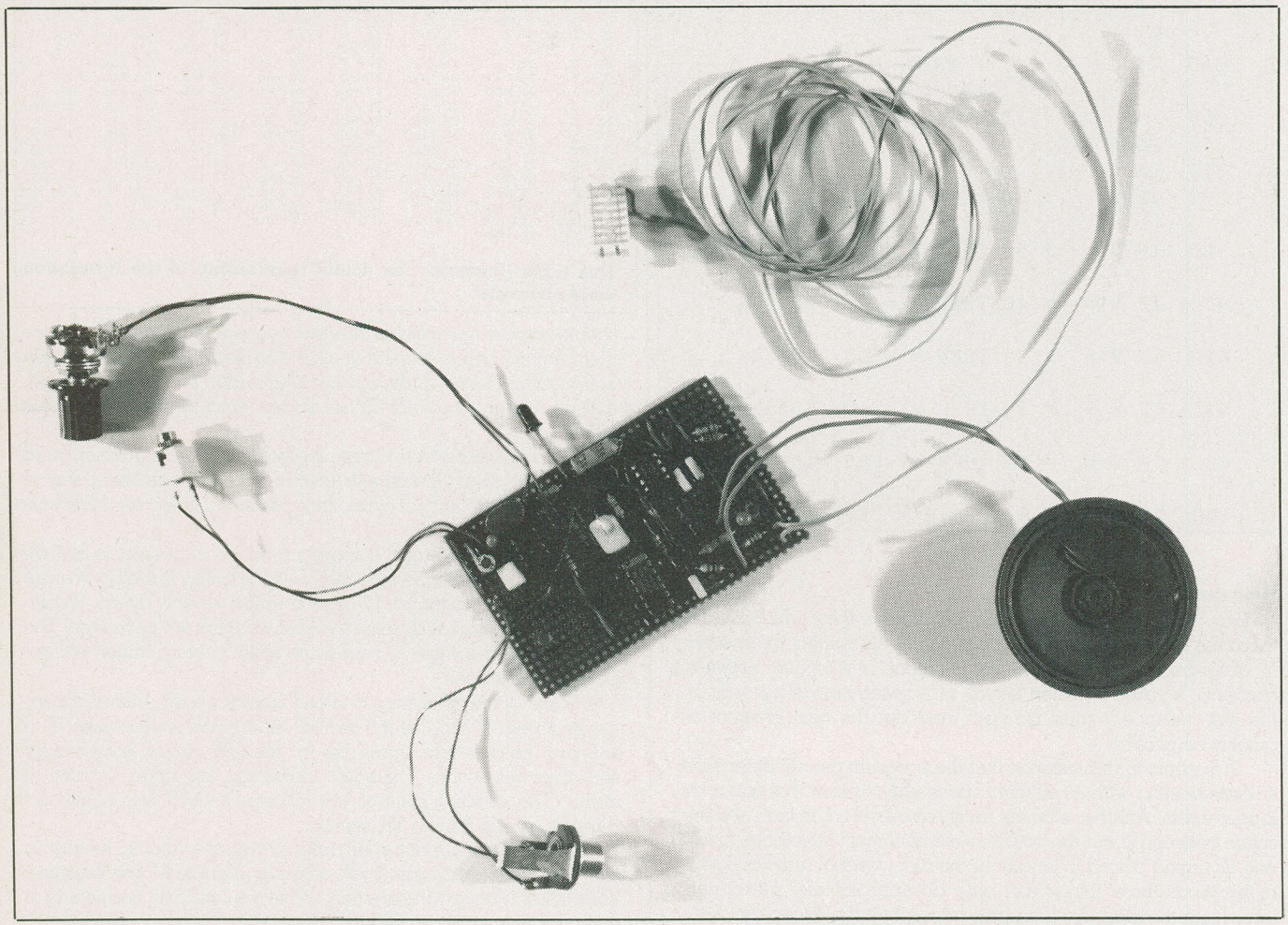
Some of the weirdness is intentional, however. I have chosen to use an equal sign for the *dah dit dit dit dah* double dash. You will find the plus sign appearing for the CW group AS when it's sent together as one character indicating that there is more to come. The percent symbol was chosen for AR and, quite arbitrarily, space for the SK symbol.

This program is not a lazy man's way of avoiding having to learn the code, although it will certainly decode Morse if getting your ticket is not on the agenda. What you will find happening is that your own ability to decode Morse will improve if you listen to the incoming signal as you watch what is happening on the screen. **CN!**

If you lack an assembler you can still get this program together. See the regenerator feature elsewhere in this issue.



The Morse Regenerator



The hardware companion to the Morse Trap, this simple circuit will take the beeps and bops of Morse code from a short wave radio and set them up for comprehension by the fruit of your choice.

by Jim Dawson

The Better Morse Trap, elsewhere in this issue, is designed to be fed with Morse code signals from somewhere. Unless you plan to have someone sit beside your computer tapping on a key, perhaps not the most useful application of it, you'll need a code regenerator.

Under ideal conditions detecting Morse code and making it into something a computer could handle would be very easy indeed, but code is rarely if ever received under ideal considerations. This regenerator takes Morse which has been partially buried in the grass and static of the atmosphere and does a creditable job of making it suitable for sending on to an Apple.

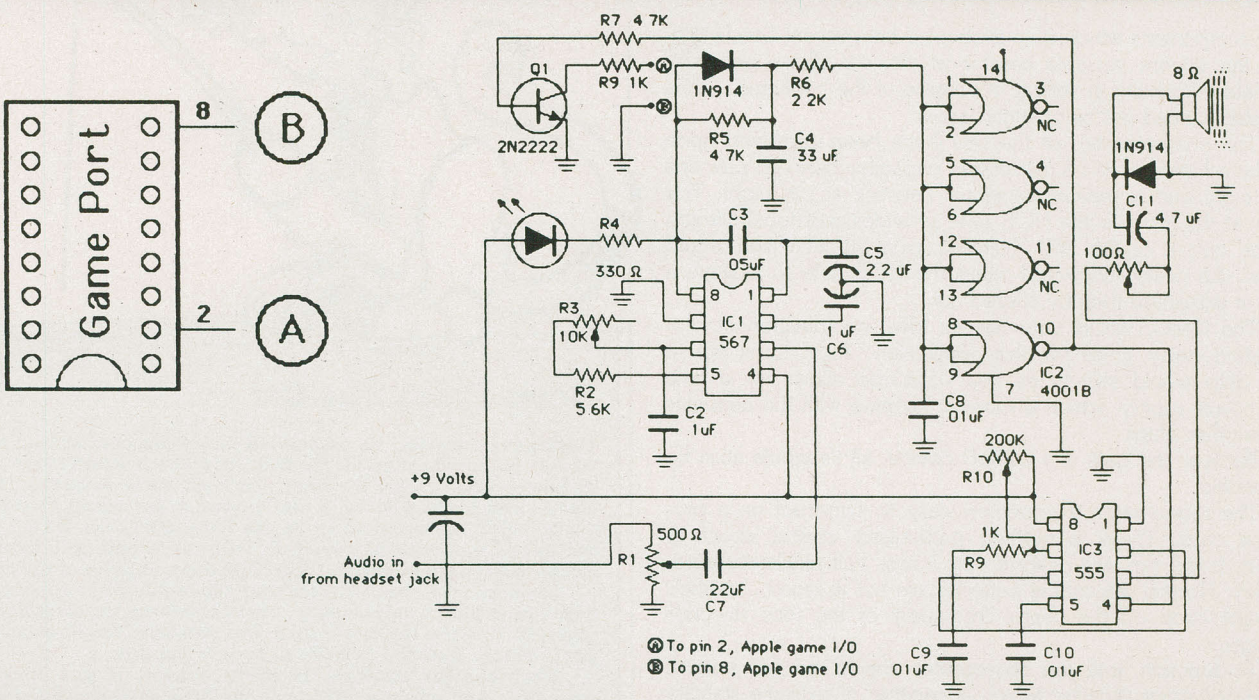
In addition, it produces a pure audio tone at one's choice of pitch beeping away the code it's fed.

Build It

At the heart of the demodulator is a 567 phase locked loop tone decoder chip, an extremely flexible device which can be configured as a simple oscillator, a quadrature oscillator, a phase shifter or, as it is in this application, a ten percent bandwidth tone decoder.

While the output from the 567 tone decoder could be used to switch the 555 audio oscillator in and out of operation, a quadruple NOR gate with a few additional components provides it with additional noise immunity. In fact, the 555 is an optional feature, required only if you want to be able to listen to the code as it comes in. The computer won't care if it's there or not.

If you look at figure one, the 567 has been configured



The Morse Regenerator

with components which give it about a ten percent bandwidth. The ten kilohm variable resistor at pin six allows one considerable flexibility in setting the centre of the passband. Once adjusted it need not be changed again.

The characteristics of the 567 have been improved upon by the addition of a .05 microfarad capacitor between pins one and eight and a resistor capacitor network at pin eight. This latter at the input to the NOR gate provides additional filtering of the output of the 567. Glitches in its signal which would sound like noise and would cause the NOR gate to indicate a lack of signal are thereby filtered out.

The CMOS NOR gate has an ideal combination of propagation delay times for this application. As it turns out, a TTL chip would switch too fast. This also allows for a nine volt power supply, which is more in keeping with the demands of the other chips.

Because the gate is a CMOS device, all its inputs must be connected.

The regenerator is extremely easy to construct on a prototype card. There is nothing particularly critical about its layout. It will run well powered by a nine volt nickle cadmium battery. Normal disposable batteries are not as good... as their voltages drop off the centre frequency of the tone decoder changes.

To function well the regenerator should be fed from a communications receiver which is capable of extreme stability once it has warmed up. Turn on the crystal marker, select one of the sidebands and tune the receiver to put the crystal in the centre of the IF range. This should produce a tone of about seven hundred and fifty hertz.

With the receiver set up, plug the audio into the regenerator and adjust R3 slowly until the LED comes on. This point is extremely narrow in the adjustment. You may have to adjust the volume control of the receiver or the input level control to the regenerator.

When the LED is on adjust the tone control of the regenerator for an acceptable pitch at the speaker.

Tune in a strong Morse signal. When the tone is identical to that of the one you selected with the crystal marker the 567 will lock, the LED will come on and the speaker should start generating a tone. Bear in mind that the passband of the regenerator is only seven hundred and fifty Hertz... be prepared to adjust things very slowly.

Parts

R1	500 Ohm pot
R2	5.6K
R3	10K pot
R4	330 ohms
R5	4.7K
R6	2.2K
R7	4.7K
R8,9	1K
R10	200K pot
R11	100 ohm pot
C1	10 microfarad electrolytic
C2	.1 microfarad poly
C3	.05 microfarad poly
C4	.33 microfarad tubular or poly
C5	2.2 microfarad tantalum
C6	1 microfarad electrolytic or tantalum
C7	.22 microfarad poly
C8,9,10	.01 microfarad poly
C11	4.7 microfarad tantalum
IC1	567 tone decoder (Radio Shack 267-1721)
IC2	4001B CMOS quad NOR gate
IC3	555
Q1	2N2222

CN!

Notes From The Cat

The Morse Trap and its associated hardware constitute a very interesting application for the fruit, one which doesn't take a lot of heavy time to get together. Jim's software is exceedingly clever, and his hardware is really easy to get going. However, Jim is rather more skilled in its use than most of us, being into radios and antennas and such. A few bits are probably in order for those not haing been initiated into the mysteries of the code.

To begin with, you can construct the regenerator out of parts from Radio Shack quite easily... there's nothing too complicated about it. You can replace a lot of the pots with fixed resistors if you... like I... decided to have at it on a Sunday.

Likewise, the software is fairly simple. If you lack an assembler you might want to use the little driver at the end of this sidebar to create CW.O, the machine language part of the program.

Using the whole works, on the other hand, is a bit tricky. Jim maintains that you have to have a really sophisticated short wave receiver to get anything out of this project and, in a sense, he's right. The more economical five band all purpose boxes... they also open cans... drift too much to keep 'em on track for very long. However, you can get tolerable results with a middle of the road machine if you let it warm up for fifteen minutes before you use it.

I tried it out with a Heathkit Mohican... which did very well... and a Radio Shack DX-160... which was tolerable... as well as a very stable Hallicrafters. Well, it's stable after the tubes start cooking.

The regenerator needs an input which is in keeping with its expectations. To begin with, if it's too low you won't get anything out. If it's too high you'll get a lot of garbage, as the tone decoder will lock onto everything harmonically related to whatever it is that you've got it tuned to... possibly checking out two signals at once.

The frequency of the tone decoder's filter has to match that of the note from your radio with the beat frequency oscillator on. You can tune either one, so long as they match. Cheaper radios, in which the beat note tends to drift, will require frequent retuning. The frequency of the regenerator won't drift at all if you've built it right.

You can check out the noise off air until you get something, plug the regenerator into the radio and twiddle the oscillator frequency until the speaker makes the same sorts of noises as the radio was doing.

In using the software you have to adjust it to the speed of the Apple code being received by specifying an initial code speed and then adjusting things by hitting the plus and minus keys. If you are into Morse code already this will be reasonably easy. If you aren't... well, prepare for a bit of a fight at first.

It takes about an hour to get used to the workings of the software. You may well spend most of this time looking at garbage on the screen... if the software isn't set to the right speed it tends to spew out random characters. As a rule, having it set too high will produce strings of single characters. Setting it too low seems to do lots of clumps of characters interspersed with asterisks.

When you finally do get the hang of it the system works astoundingly well, and will cheerfully demodulate very fast code indeed.

Finally, unless you have a fruit with radio frequency shielding... few of 'em have this... you will find that the computer will interfere with weak transmissions if you are using a cheap radio that lacks a shielded input. There isn't a lot you can do about this... except to look for stronger signals.

Horatio

A Few Abbreviations

Morse code transmissions are often fraught with abbreviations for commonly used expressions. This can make the whole experience look like random bits if you haven't got a score card. Here's a look at some of the common ones.

AA	All after	RFI	Interference
HR	Here	CQ	Calling any station
AB	All before	ED	Said
HV	Have	CUD	Could
ABT	About	SRI	Sorry
MSG	Message	CUL	See you later
ADR	Address	SVC	Service
AGN	Again	CUM	Come
NIL	Nothing	TNX	Thanks
ANT	Antenna	DX	Distance
NM	No more	TXT	Text
BCI	Broadcast interference	FB	Fine business
NR	Number	VY	Very
BCL	Broadcast listener	GA	Go ahead
PBL	Preamble	WX	Weather
BK	Break	GB	Good bye
PX	Press	TX	Transmitter
C	Yes	GND	Ground
RCD	Received	73	Best regards
CFM	Confirm	GUD	Good
RX	Receiver	88	Love and kisses
CK	Check	HI	High or hee (laughter)

```
]LIST

10 ST = 28672
20 SP = 29095
30  FOR X = ST TO SP
40  READ A:B = B + A
50  POKE X,A
60  NEXT X
70  PRINT  CHR$ (4);"BSAVE CW.O   ,A$7000,L$01AF"
80 CH = 58118
90  IF B <  > CH THEN  PRINT "ACK! DATA CHECKSUM ERROR..."
100  END
110  REM  IF THE CHECKSUM ERROR APPEARS
120  REM  THERE IS AN ERROR IN THE DATA
130  REM  STATEMENTS
10000  DATA  169, 0, 133, 132, 169, 58
10010  DATA  133, 129, 32, 88, 252
10020  DATA  24, 144, 122, 170, 160
10030  DATA  197, 212, 201, 193, 206
10040  DATA  205, 211, 213, 210, 215
10050  DATA  196, 203, 199, 207, 200
10060  DATA  214, 198, 160, 204, 160
10070  DATA  208, 202, 194, 216, 195
10080  DATA  217, 218, 209, 160, 171
10090  DATA  181, 180, 160, 179, 160
10100  DATA  160, 160, 178, 171, 160
10110  DATA  165, 160, 160, 160, 160
10120  DATA  177, 182, 189, 175, 160
10130  DATA  160, 160, 160, 160, 183
10140  DATA  160, 160, 160, 184, 160
10150  DATA  185, 176, 160, 160, 160
10160  DATA  160, 160, 192, 160, 160
10170  DATA  160, 160, 160, 160, 191
10180  DATA  160, 160, 160, 160, 160
10190  DATA  160, 160, 160, 174, 160
10200  DATA  160, 160, 160, 160, 160
10210  DATA  160, 160, 160, 160, 160
10220  DATA  160, 160, 160, 160, 160
10230  DATA  160, 160, 160, 160, 187
10240  DATA  160, 160, 160, 160, 160
10250  DATA  160, 160, 160, 172, 160
10260  DATA  160, 160, 160, 186, 160
10270  DATA  169, 1, 133, 128, 6
10280  DATA  128, 169, 0, 133, 131
10290  DATA  32, 152, 112, 76, 226
10300  DATA  112, 173, 0, 192, 141
10310  DATA  16, 192, 48, 8, 173
10320  DATA  97, 192, 201, 128, 16
10330  DATA  241, 96, 56, 201, 174
10340  DATA  144, 8, 76, 160, 112
10350  DATA  24, 201, 174, 176, 235
10360  DATA  24, 201, 171, 144, 230
10370  DATA  201, 172, 144, 8, 230
10380  DATA  129, 32, 237, 253, 76
10390  DATA  160, 112, 165, 129, 24
10400  DATA  201, 4, 144, 211, 198
10410  DATA  129, 169, 171, 32, 237
10420  DATA  253, 76, 160, 112, 162
10430  DATA  1, 160, 200, 136, 208
10440  DATA  253, 202, 208, 248, 96
10450  DATA  32, 152, 112, 169, 1
10460  DATA  133, 131, 32, 215, 112
10470  DATA  44, 97, 192, 16, 3
10480  DATA  76, 226, 112, 162, 0
10490  DATA  134, 132, 32, 215, 112
10500  DATA  230, 131, 32, 215, 112
10510  DATA  44, 97, 192, 48, 41
10520  DATA  166, 132, 232, 134, 132
10530  DATA  24, 228, 129, 208, 236
10540  DATA  165, 129, 32, 168, 252
10550  DATA  44, 97, 192, 48, 21
10560  DATA  76, 51, 113, 165, 129
10570  DATA  32, 168, 252, 165, 129
10580  DATA  32, 168, 252, 44, 97
10590  DATA  192, 48, 3, 76, 51
10600  DATA  113, 6, 128, 76, 60
10610  DATA  113, 169, 1, 24, 101
10620  DATA  128, 133, 128, 6, 128
10630  DATA  44, 97, 192, 16, 251
10640  DATA  169, 0, 133, 131, 230
10650  DATA  131, 165, 129, 24, 197
10660  DATA  131, 144, 18, 44, 97
10670  DATA  192, 16, 6, 32, 215
10680  DATA  112, 76, 69, 113, 169
10690  DATA  0, 133, 131, 76, 226
10700  DATA  112, 169, 0, 133, 131
10710  DATA  230, 131, 44, 97, 192
10720  DATA  16, 238, 165, 129, 24
10730  DATA  197, 131, 144, 6, 32
10740  DATA  215, 112, 76, 100, 113
10750  DATA  165, 128, 74, 168, 185
10760  DATA  14, 112, 32, 237, 253
10770  DATA  169, 21, 133, 131, 166
10780  DATA  131, 134, 131, 44, 97
10790  DATA  192, 16, 15, 165, 129
10800  DATA  32, 168, 252, 166, 131
10810  DATA  202, 208, 239, 169, 160
10820  DATA  32, 237, 253, 169, 1
10830  DATA  133, 128, 6, 128, 76
10840  DATA  226, 112, 0
```

Streaming Tape

If you have a hard drive full of irreplaceable data whirring around on your PC you will inevitably be interested in how to archive it. Streamers offer a viable alternative to tottering stacks of floppies.

by Frank Lenk

You may well ask what streaming tape is... whether it really streams and if so why. These and other pithy questions have long been begging for answers. Tape backup devices fall into that large and nebulous class of micro accessories that nobody seems to know much about... until they suddenly discover that they can't survive without one.

Inevitably, the place to start is with some history.

One of the earliest forms of mass storage used in computing was the magnetic tape. Avid watchers of late night science fiction flicks will be familiar with the appearance of large mainframe type tape transports... wardrobe sized boxes with huge open reels of tape that continually performed exactly the maneuver implied by their name. In addition to looking impressive, the starting and stopping action made it possible to record individual user files.

When disk storage became widespread in the microcomputer community, tape once more gained a place for itself... this time as a medium for backing up all that easily accessible disk data. *Streaming* the tape... that is, running it continuously... eliminated all the bizarre start and stop overheads and made it possible to back up huge amounts of data quite cheaply.

If you use hard disks to hold important data you'll quite likely have at least heard about streamers. While one can back up the contents of a fixed disk onto multiple floppies, the process is slow and tedious... and likely to to be neglected just prior to a disk crash. A streamer is the ideal replacement.

Islands in the Stream

Streaming tape technology has remained pretty much of a constant for some time. However, there have just recently been two separate Canadian product introductions relating to exactly this abstruse field of knowledge.

Tallgrass Technologies got its start in the grassy plains of Kansas on a shoestring float of about five thousand dollars. The company's first product was a high performance, relatively low cost hard disk and backup tape combination, released in late 1981. Putting this in perspective, Tallgrass notes that it was only the previous year that saw the introduction of the first six megabyte Winchester hard drives.

The inherent reliability and low cost of the Tallgrass backup system was built on an existing tape cassette, the standard 3M telecommunications cartridge, then in computing use only on minis. The success of this concept has been demonstrated by retail outlet sales of over forty thousand of the Tallgrass disk and tape drives to date.

In spite of the popularity of these streaming tape systems... from Tallgrass and numerous competitors... the format had some built in limitations. The most major of these is the inability to handle anything but complete disk loads of data rather than individual files. Less obvious but nevertheless reflected in the hardware costs is the complexity of the three gap tape recording head. Separate gaps are generally needed to read, write, and erase.

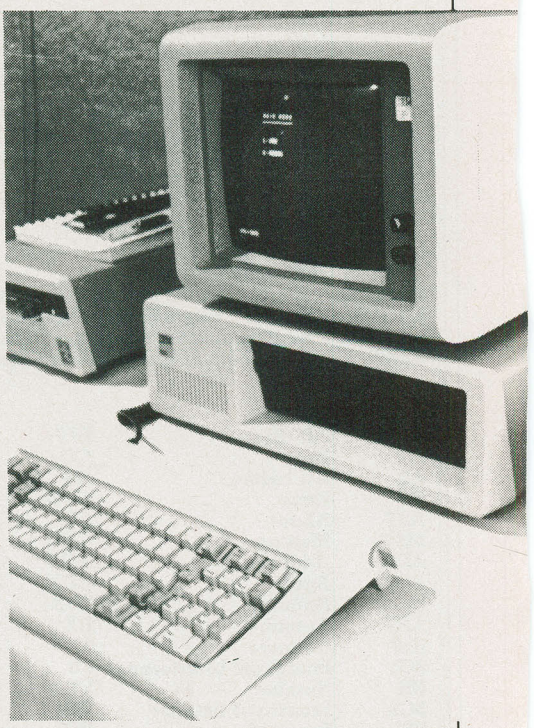
Streaming tapes use a surface recording technique, improving bit resolution by recording on the surface of the medium instead of saturating it. This technique demands that the tape be erased prior to its being re-recorded... hence the separate erase gap on the head. Since all the tracks are erased together there is no way of moving chunks of data short of redoing the whole tape.

Recently Tallgrass has come up with a whole new approach. Its new hardware is built around a much simpler single gap head that is incapable of erasing old data, but doesn't flinch at overwriting the way it would on any disk drive.

The new system consists of four tape and disk units, ranging from twenty-five to eighty megabytes of disk capacity, each with a sixty megabyte tape drive. The prices are not cheap, ranging from over five thousand dollars for the twenty-five megabyte system up to over eleven thousand for the eighty megabyte drive. The tape drive can be had separately for just under three thousand.

The controller card runs an extra two hundred and fifty dollars on top of all these rates, and the tape cartridges themselves go for over fifty bucks a pop.

The older Tallgrass drives were apparently about twenty to thirty percent faster than XT drives, and the new models should run as much again faster than the old. That should make the newer Tallgrass disks up to fifty percent faster than IBM's own... quite aside from their larger storage capacity.

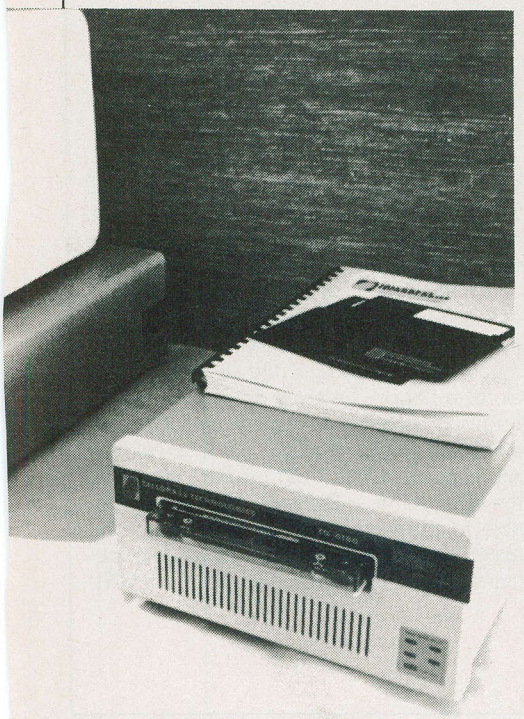


Pulling files from the Tallgrass disk is a lot like using a RAM disk. Oddly enough, the higher capacity disks run the fastest, since they benefit from the very highest level of technology. Part of the speed advantage comes from the Tallgrass technique of reading an entire track at a time, compared to the XT's twenty reads per track.

In spite of their performance edge, Tallgrass states that its drives should be "one hundred percent IBM compatible."

The single board combination disk and tape controller offers a number of attractive features, like direct booting from the hard drive. It also supports standard disk partitioning, since DOS can't quite conceive of a disk larger than thirty-two megabytes. As it is constructed without the use of a dedicated microprocessor, much of the controller's circuitry has been combined into a single CMOS chip, enhancing its reliability and reducing the overall cost. Tallgrass has so impressed itself with this that it has begun drumming up interest among computer manufacturers for direct incorporation of the controller in new machines.

The software which drives the system is called PC/T... the Personal Computer Tape recording format. It is already showing signs of becoming accepted. According to Tallgrass, Hewlett-Packard has endorsed the format for use with future tape cartridge storage systems and 3M has accepted it for use with its standard DC 1000 and DC



2000 quarter inch tape cartridges.

In Tallgrass' own implementation of PC/T the tape is run at seventy–five inches per second, with data recorded at the rate of ninety–six hundred bits per inch in up to eleven tracks. In addition, Tallgrass has opted to partition the data into large eight kilobyte blocks, improving the ratio of data storage versus overhead. Recording is in the group code recording format already well accepted for half inch tape.

The new tape systems use a file directory, much like you'd find on any disk. Furthermore, an identification record is added at the start of each data block, making it easy to locate individual files anywhere on the tape. Deleted files can even be recovered, subject to the same sort of restriction common to disk storage. Disk like formatting also means that bad sectors can be detected and flagged before it's too late.

The Tallgrass system is also heavily into error correction capability. Two or more data records are combined using an exclusive or function, creating a separate parity record. In the event of a failed read operation any data record can be reconstructed by recombining the parity information and the surviving data record. Forty bit cyclic redundancy checking is used to track down suitable candidates for this kind of reconstruction. An optional read after write mode uses a second tape head to perform automatic and continual verification of data as it is stored.

The literature supplied by Tallgrass is not shy about admitting that tape is inherently more susceptible to data errors than is the solidly protected medium in a Winchester disk. Not only is tape more exposed, but the surface recording technique it uses is also more conducive to byte sized rather than single bit errors. Of course, the difference is just a shading in terms of probabilities. The extensive redundancy and self checking used by Tallgrass should provide suspenders and belt coverage.

The Yellow Rose of TEX

All of this wonderful hardware needs some software support. This fact did not go unnoticed at Tallgrass. The new series of disk and tape units is supported by something called the tape executive... TEX for short. This program provides a complete shell interface to the external drives, using commands that should be familiar to anyone enured to the vagaries of DOS.

Typing the command TEX at the DOS prompt implements a new set of commands... most of them identical to equivalent disk oriented commands. Once in TEX you can catalog your tape using the DIR command to view a slightly expanded version of the normal DOS file listing. You can copy files one at a time or in bunches, from tape to tape or disk to tape or any combination you please.

Tape drives are specified using numbers and a colon, just as disk drives are accessed using a letter and a colon. All the conventional directory structures are available.

Unlike DOS, TEX includes a help command. Typing help reveals roughly the following menu:

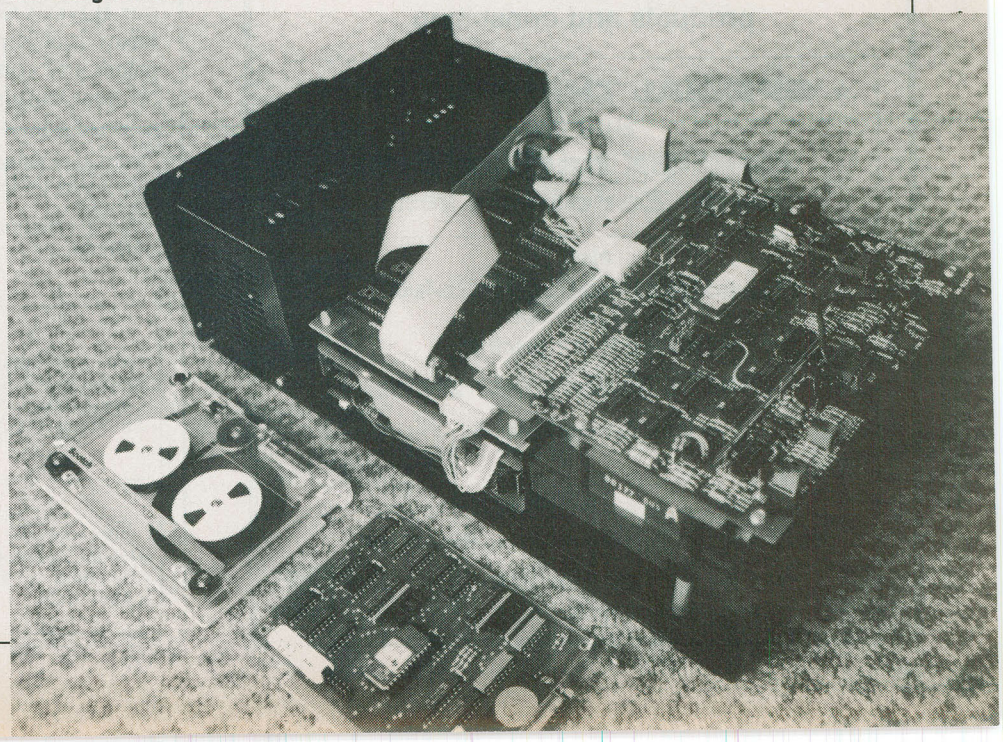
BACKUP	**HELP**	**RETENSION**
CHDIR	**IMAGE**	**RMDIR**
COPY	**MKDIR**	**TREE**
DEL	**PRINT**	**TYPE**
DIR	**RENAME**	**VER**
ERASE	**RESTORE**	**VOL**

IMAGE is used to make an old fashioned backup image of everything on a disk. For a twenty meg hard drive this command will form a single twenty meg tape file... a fifteen minute chore. RETENSION does a complete rewind of the tape, forward and back again, so as to tighten up those tapes that may have sagged a bit during months on the shelf. Most useful of all, VER reveals the version number of the TEX program.

The BACKUP command supports the particularly nice '/M' option found in DOS. This backs up only those files that have been modified since they were last copied, checking one of those little known DOS file status flags... the archive bit, to be exact... in order to identify the appropriate files. The user could thus do only a single blanket BACKUP when starting up a data system, then just backup current files on a daily basis.

Files remain accessible. In fact, with a standard length DC 600A tape cartridge it should take only about ninety seconds to run from one end of the tape to the other. These are not quite hard disk speeds, but a whole lot faster than the Coleco Adam...

The Tallgrass Streamer



Streaming Tape

On the Home Front

At the exact opposite end of the price spectrum is a new backup system from Aftek Business Machines. Unlike Tallgrass, Aftek is a Canadian company. Also unlike Tallgrass, Aftek is a relatively young operation, incorporated less than two years ago as a subsidiary of Distributed Online System Services, a company concerned mainly with mainframe hardware and software.

Aftek had been looking for a chance to branch out a bit, and has now found its opportunity. Aftek's latest addition is known as Datasafe... a micro reel streamer tape device. In drastic contrast to the Tallgrass approach, this system is mounted inboard like a half height floppy drive and runs with any stock PC disk controller. It is also available boxed as a stand alone system. The outboard box costs about seventeen hundred dollars, while the inboard system sells for thirteen bills.

Datasafe breaks with tradition on the style of its tape cartridge, using a self loading open reel about the size and shape of a typewriter ribbon. The front of the drive opens to the side, bringing with it a little metal post. Drop the reel on this axle, close the door, press a switch and the tape threads itself into the drive mechanism. Aftek maintains that the mechanism has performed a hundred and fifty thousand loads without a failure.

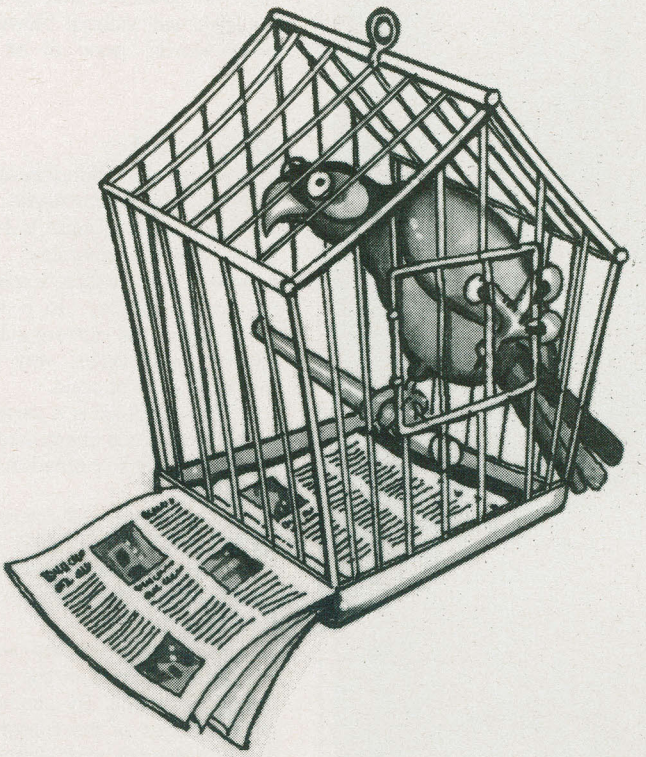
Datasafe comes in ten and twenty megabyte capacities, although ten megabyte reels can be used in either. Although the storage capacity is much lower than on the 3M cartridges, the little open reels sell for much less... about twenty-eight dollars each.

Aftek... in conjunction with the University of Waterloo... has produced software device drivers to allow the tape drives to emulate disk drives, accepting normal file oriented commands. The drivers load as a conventional CONFIG.SYS when DOS is booted. From then on the Datasafe is totally transparent to DOS, referenced as drive D:. All the DOS commands work on this drive as they would with any other. As with the Tallgrass system, the Datasafe drivers are capable of locating and tagging bad sectors on the tape.

Hooking up a drive D: is something of a trick, however. The stock IBM disk controller card offers four channels, but only two are intended for internal use. The other two feed out the back in a DB-37 connector. Furthermore, the PC leans toward full height disk drives, leaving little room for frivolities like tape backup. Hence there exists an outboard Datasafe unit, which can easily hook onto the external connector.

The trade off in using the existing floppy controllers appears to be in speed. With a nominal data transfer rate about the same as for a floppy, Datasafe drives take about twenty minutes to back up ten megabytes of data. This would be a little less than half the speed possible with Tallgrass hardware. On the other hand, a Datasafe drive should be able to run from end to end of a tape in about eighty seconds, so the file access times remain pretty reasonable. **CN!**

Some Computer Magazines have a Habit of Just Dropping In



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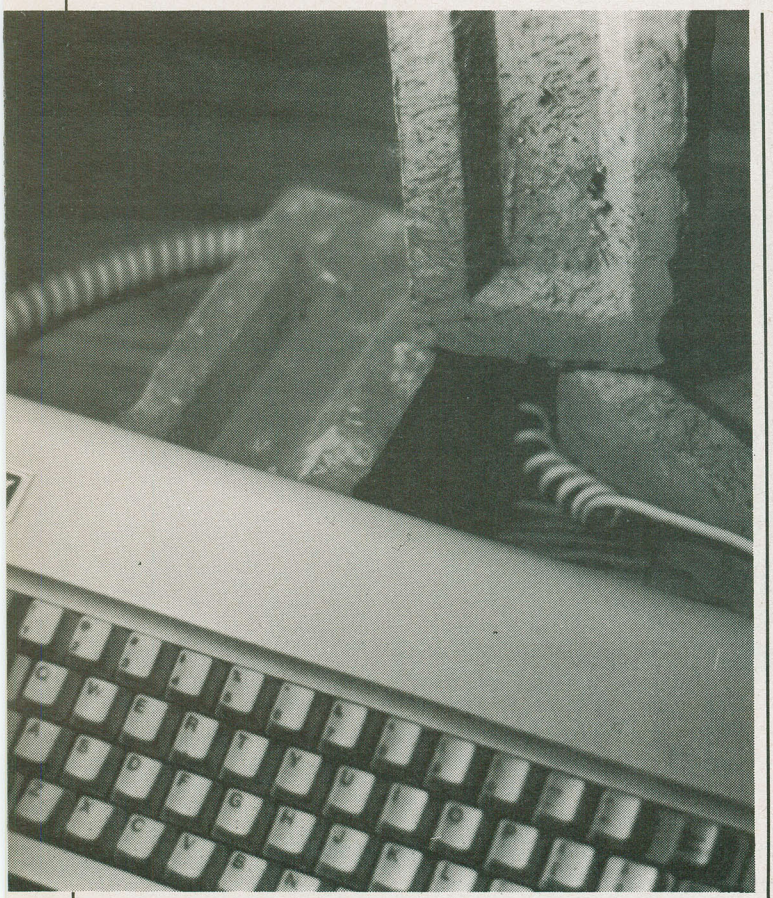
Wunderwall for the PC



There's nothing like a simple BASIC game. Wombat souffle, for example, is completely unlike one.

by Steve Rimmer

If one is to have any respect at all from one's computer one must be prepared to inflict upon it the occasional beeping, flashing, destructive game. This keeps said computer in its place and gives it a more eclectic outlook on the universe as a whole.

As excuses for running programs like Wunderwall go, this is certainly no worse than most. It probably won't work on one's boss, one's friends or even, in fact, on one's cat. Even as I write this, with the thing beeping its brains out on the PC behind me, Horatio the office feline is looking on with a kind of bemused satisfaction. He imagines that the ball is some sort of anchovy, and as soon as he thinks I'm not looking I know he's going to try to make it though the glass.

Horatio is incontrovertable proof of the effect of cathode rays on living tissue. He's been sleeping on the monitors for so long his brains have fallen out.

Wunderwall is a simple game written in BASIC for the IBM PC. It uses no high resolution graphics, so it can be run on systems with nothing more than a monochrome display card. Likewise, it isn't specific to BASIC 2.0, so owners of older variants can have at it too. It is based on the premise that one can bounce a smiling face off the sky and blast the bricks out of a wall without blowing up the imbedded bombs, or, in other words, none at all. It's fast, noisy, and moderately weird.

Wunderful

The source for Wunderwall is actually extremely short... but, as you'll note, rather dense.

Because the game is fairly simple, most of the things the game has to remember... like where the bombs are... are handled by the simple expedient of having it constantly look at the screen display. In a more involved implementation one would keep the current status of things in an array... a more efficient, and faster, way of handling the information... but this takes a lot of code.

The wall itself is a series of bricks. Each brick is made up of three graphics characters, as seen starting with line 280. The last sort of brick, printed in line 320, is a flashing box, to wit, a bomb.

A complete wall consists an array of bricks running from (WALL.LEFT,WALL.TOP) to (WALL.RIGHT+3, WALL.BOTTOM). The values for these variables are established at the top of the program. There will be BOMB.COUNT flashing bombs imbedded in it.

Having set up the wall, the program creates the ball bucket, the source of the smiling balls which one uses to blast through the wall. By aiming the balls skyward... they bounce off the edges of the screen... one can knock out bricks from the Wunderwall and attempt to create a path through to the bottom. If the ball hits a bomb the world comes to an end.

The ball bucket is a bit tricky. In order to keep the game lively we want to have it moving all the time... sliding back and forth along the bottom of the screen. It continues in whatever direction it was last going until one of the horizontal arrow keys is struck or it hits either end of its travel... in which case it'll beep and reverse. It's fairly hard to keep the bucket positioned accurately... which is part of the fun.

In fact, in doing this it's advantageous, in terms of the running speed of the code, to have two separate bucket handlers. There's one starting at line 530 which takes care of the ball when there is no ball in the air and one at line 670 that does it when there is. It's important, in doing code that has to be optimized for speed, that the critical bits have to go through the least amount of stuff possible. As such, in these cases multiple similar tasks should be handled by multiple dedicated chunks of code rather than a lot of flags and decisions.

When the program is looping around in the upper bucket loop it looks for the right and left arrow keys.. which alter the bucket's direction... set in BUCKET.VECTOR... and the space bar, which is the command to fire all guns... or balls. Having hit the latter occurrence it drops into the lower loop. This also handles the moving bucket, but it also moves the ball. The bucket will therefore appear to slow down a bit.

Animating the ball is fairly simple. The program prints a smiling face, waits a while, erases it and prints another one smiling a bit further along its path. This is handled by maintaining the X and Y co-ordinates of the ball in the variables X.POS and Y.POS. The direction vectors are in X.VECTOR and Y.VECTOR. In this case, these vectors are the numbers which are added to the positions to move the ball one position further along its travel.

```
10 ' --------------------------------
20 '
30 '        W u n d e r w a l l
40 '  Copyright (c) 1985 Steve Rimmer
50 '
60 ' --------------------------------
70 '
80 DEFINT A-Z : KEY OFF
90 WALL.TOP = 14 : WALL.BOTTOM = 22
100 WALL.LEFT = 3 : WALL.RIGHT = 77
110 BALL.BUCKET = 40
120 BALL$ = CHR$(1) : BUCKET$ = " " + CHR$(240) + " "
130 BOMB.COUNT = 20
140 BUCKET.VECTOR = -1
150 CLS
160 LOCATE 10,27,0 : PRINT CHR$(213) STRING$(15,205) CHR$(184)
170 LOCATE 11,27,0 : PRINT CHR$(179) SPACE$(15) CHR$(179)
180 LOCATE 12,27,0 : PRINT CHR$(179) "  Wunderwall   " CHR$(179)
190 LOCATE 13,27,0 : PRINT CHR$(179) " Copyright (c) " CHR$(179)
200 LOCATE 14,27,0 : PRINT CHR$(179) " Steve  Rimmer " CHR$(179)
210 LOCATE 15,27,0 : PRINT CHR$(179) SPACE$(15) CHR$(179)
220 LOCATE 16,27,0 : PRINT CHR$(212) STRING$(15,205) CHR$(190)
230 DIM WALL(80,24)
240 GOSUB 330 'randomize wall
250 CLS : GOSUB 440
260 GOSUB 520
270 END
280 PRINT STRING$(3,32); : RETURN 'print a gap
290 PRINT STRING$(3,176); : RETURN 'print brick one
300 PRINT STRING$(3,177); : RETURN 'print brick two
310 PRINT STRING$(3,178); : RETURN 'print brick three
320 COLOR 31 : PRINT STRING$(3,219); : COLOR 7
    : RETURN 'print a bomb
330 'randomize wall
340 RANDOMIZE TIMER
350 FOR Y = WALL.TOP TO WALL.BOTTOM
360    FOR X = WALL.LEFT TO WALL.RIGHT STEP 3
370          WALL(X,Y) = INT(RND * 3) + 2
380    NEXT X
390 NEXT Y
400 FOR X = 1 TO BOMB.COUNT
410     WALL(3*INT((RND*((WALL.RIGHT-WALL.LEFT)/3))),WALL.TOP
        + (RND*(WALL.BOTTOM-WALL.TOP))) = 5
420 NEXT X
430 RETURN
440 'print the wall
450 FOR Y = WALL.TOP TO WALL.BOTTOM
460    FOR X = WALL.LEFT TO WALL.RIGHT STEP 3
470          LOCATE Y,X,0
480          ON WALL(X,Y) GOSUB 280,290,300,310,320
490    NEXT X
500 NEXT Y
510 RETURN
520 'do bouncing ball
530 A$ = INKEY$
540 IF A$ = CHR$(0) + CHR$(75) THEN BUCKET.VECTOR = -1
550 IF A$ = CHR$(0) + CHR$(77) THEN BUCKET.VECTOR = 1
560 IF BUCKET.VECTOR =-1 AND BALL.BUCKET >= WALL.LEFT+3
    THEN BALL.BUCKET = BALL.BUCKET -1 : LOCATE 23,BALL.BUCKET-1,0
     : PRINT BUCKET$
570 IF BUCKET.VECTOR = 1 AND BALL.BUCKET =< WALL.RIGHT-3
    THEN BALL.BUCKET = BALL.BUCKET +1 : LOCATE 23,BALL.BUCKET-1,0
     : PRINT BUCKET$
580 IF BALL.BUCKET = WALL.LEFT+3 OR BALL.BUCKET = WALL.RIGHT-3
    THEN BUCKET.VECTOR = BUCKET.VECTOR * -1 : PLAY "MB02D"
590 IF A$ = " " THEN 600 ELSE 530
600 'start ball travel
610 PLAY "MB03B"
620 IF BALL.BUCKET > 40 THEN X.VECTOR =1 : IF BALL.BUCKET > 50
    THEN X.VECTOR = 2 : IF BALL.BUCKET > 60 THEN X.VECTOR = 3
630 IF BALL.BUCKET < 41 THEN X.VECTOR =-1 : IF BALL.BUCKET < 30
    THEN X.VECTOR = -2 : IF BALL.BUCKET < 20 THEN X.VECTOR = -3
```

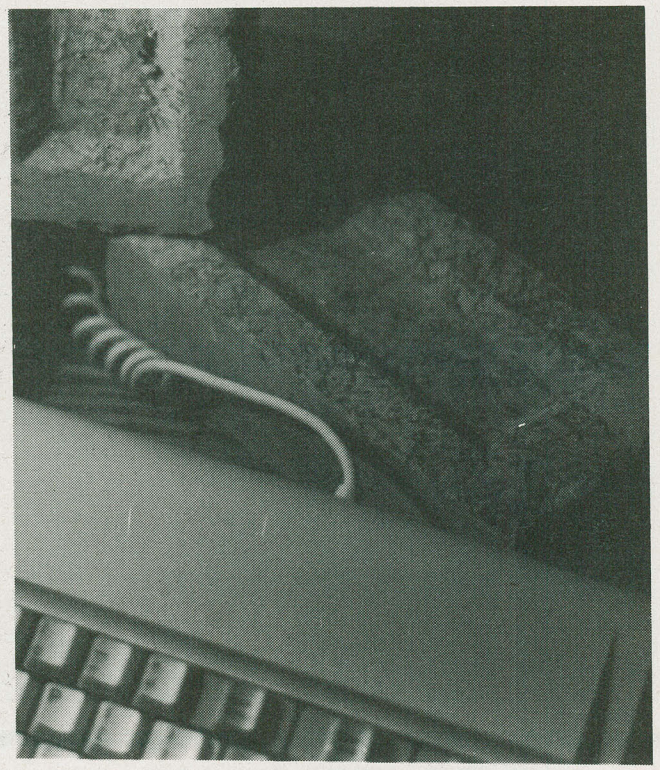
Wunderwall for the PC

```
640 Y.VECTOR = -1
650 X.POS = BALL.BUCKET : Y.POS = 23
660 'main ball loop
670 A$ = INKEY$
680 IF A$ = CHR$(0) + CHR$(75) THEN BUCKET.VECTOR = -1
690 IF A$ = CHR$(0) + CHR$(77) THEN BUCKET.VECTOR = 1
700 IF BUCKET.VECTOR =-1 AND BALL.BUCKET >= WALL.LEFT+3
     THEN BALL.BUCKET = BALL.BUCKET -1 : LOCATE 23,BALL.BUCKET-1,0
      : PRINT BUCKET$
710 IF BUCKET.VECTOR = 1 AND BALL.BUCKET =< WALL.RIGHT-3
     THEN BALL.BUCKET = BALL.BUCKET +1 : LOCATE 23,BALL.BUCKET-1,0
      : PRINT BUCKET$
720 IF BALL.BUCKET = WALL.LEFT+3 OR BALL.BUCKET = WALL.RIGHT-3
     THEN BUCKET.VECTOR = BUCKET.VECTOR * -1 : PLAY "MBO2D"
730 BALL.BYTE = SCREEN(Y.POS,X.POS) : BALL.ATTR =
     SCREEN(Y.POS,X.POS,1)
740 IF BALL.BYTE <> 32 AND Y.VECTOR = 1 THEN 970
750 LOCATE Y.POS,X.POS,0 : PRINT BALL$
760 X.OLD = X.POS : Y.OLD = Y.POS
770 X.POS = X.POS + X.VECTOR : Y.POS = Y.POS + Y.VECTOR
780 IF X.POS >= WALL.RIGHT OR X.POS =< WALL.LEFT
     THEN X.VECTOR = X.VECTOR * -1 : PLAY "MBO3A"
790 IF Y.POS =< 2 THEN Y.VECTOR = Y.VECTOR * -1 : PLAY "MBO2C"
800 IF Y.POS >= 23 THEN 850
810 IF BALL.ATTR > 127 THEN COLOR 31 ELSE COLOR 7
820 LOCATE Y.OLD,X.OLD,0 : PRINT CHR$(BALL.BYTE)
830 COLOR 7
840 GOTO 660
850 'ball travel over
860 PLAY "MBL16O2CDEFGABO3CDEFGABC"
870 LOCATE Y.OLD,X.OLD,0 : PRINT CHR$(BALL.BYTE)
880 LOCATE 10,29,0 : PRINT CHR$(213) STRING$(14,205) CHR$(184)
890 LOCATE 11,29,0 : PRINT CHR$(179) SPACE$(14) CHR$(179)
900 LOCATE 12,29,0 : PRINT CHR$(179) "  All Right!! " CHR$(179)
910 LOCATE 13,29,0 : PRINT CHR$(179) SPACE$(14) CHR$(179)
920 LOCATE 14,29,0 : PRINT CHR$(212) STRING$(14,205) CHR$(190)
930 LOCATE 23,20,0 : PRINT "Another game? (Y or N) "
940 A$ = INPUT$(1) : IF INSTR("YyNn",A$) = 0 THEN 1140
950 IF INSTR("Yy",A$) <> 0 THEN RUN
960 CLS : END
970 'found a brick
980 PLAY "MBO2E"
990 X.POS = 3 * INT(X.POS/3)
1000 DEAD.BRICK = SCREEN(Y.POS,X.POS) - 175
1010 IF DEAD.BRICK = 44 THEN 1060
1020 LOCATE Y.POS,X.POS,0 : PRINT "   "
1030 SCORE = SCORE + (100 * DEAD.BRICK)
1040 LOCATE 1,1,0 : PRINT "!!! Score: " SCORE "!!!"
1050 GOTO 520
1060 'detonated bomb
1070 PLAY "MBO3116BAGFEDCO2BAGFEDCBA"
1080 LOCATE 10,27,0 : PRINT CHR$(213) STRING$(14,205) CHR$(184)
1090 LOCATE 11,27,0 : PRINT CHR$(179) SPACE$(14) CHR$(179)
1100 LOCATE 12,27,0 : PRINT CHR$(179) " You Blew It! " CHR$(179)
1110 LOCATE 13,27,0 : PRINT CHR$(179) SPACE$(14) CHR$(179)
1120 LOCATE 14,27,0 : PRINT CHR$(212) STRING$(14,205) CHR$(190)
1130 LOCATE 23,20,0 : PRINT "Another game? (Y or N) "
1140 A$ = INPUT$(1) : IF INSTR("YyNn",A$) = 0 THEN 1140
1150 IF INSTR("Yy",A$) <> 0 THEN RUN
1160 CLS : END
```

Because the ball is always moving at an angle with regards to the edge of the screen, the numbers in the vectors will never be zero. With each successive move the X and Y co-ordinates will both be getting larger or smaller. If we assume that X.VECTOR starts off equalling one and Y VECTOR starts of equalling minus one, the ball will move up the screen and to the right.

We can change the direction of the ball by multiplying the appropriate vector by minus one, which will simply change its sign. We do this in lines 780 and 790 when the ball hits one of the screen edges.

The PC's BASIC has a very convenient function called SCREEN which returns information about the character in the tube pointed to by its arguments. We can tell both what the characteris an what its attribute is set to. Thus, having the ball knock out bricks is easy. If the Y.VECTOR is one... this would mean that the ball is coming down the screen... and the character under the next position of the ball is not a space the ball has obviously struck something, ending its travel.



If the ball hits anything but character 219, the bomb character, we'll round its X co-ordinate down to the nearest three, which will point to the first character in the current brick. Printing three spaces at this point will make the brick vanish, and we can pop back to the upper bucket loop to await the firing of another ball.

If the character is a 219, of course, the game's over. The bombs detonate, depressing music plays and an appropriate message shows up on the glass.

The final contingency is taken care of in line 800... it handles the ball reaching the bottom of the screen without having encountered anything but air. This will happen if previous balls have blasted their way through the wall and the current ball has managed to follow this path to the bottom of the screen. Line 800 traps the ball if its Y.POS variable is equal to the bottom of the tube.

The Big Blast

Wunderwall may not replace Donkey Kong in your heart, but it does make for an interesting time killer. You can, of course, modify it considerably to make it more sophisticated. With a few patches it can be compiled with BASCOM, making it a considerably more exciting game.

Developing short moderately silly games like this is made a lot easier by using yet another powerful feature of the PC's BASIC, that of allowing for long variable names. Unlike as in the case of some of the smaller BASICs one encounters... which often limit one to names with as few as two significant characters... the PC's BASIC can handle names up to forty characters long provided that they start with alphabetic characters. This makes it fairly easy to choose mnemonic variables and keep things a bit clearer.

Now... anyone for a quick blast... **CN!**

Computer Fair Preview

The Computer Fair opens in Toronto this month. Here's a look at some highlights...

The two systems *Commodore Business Machines* are expected to be showing at the Computer Fair are aimed at both the home and business markets.

The first, the **Commodore 128**, seems to be suited for both markets. As reported in Computer Press in our April issue, the Commodore 128 is three machines in one. The 128 can run off-the-shelf CP/M software like WordStar and dBASE II, is compatible with all Commodore 64 peripherals and over 6,000 C64 programs and offers its own expanded operating system as well.

Features of the Commodore 128 include 128K of RAM expandable in 128K increments to 512K, a user selectable 40/80 column full colour display and optional mouse-controlled operation. The 92 key typewriter style keyboard features a 14-key numeric keypad, individual cursor keys, eight programmable function keys and a HELP key.

Commodore is also expected to reveal the **Commodore PC 10** at the Fair. Resulting from Commodore's agreement with Quebec-based Bytec-Comterm, the PC 10... manufactured in Germany... is a new personal computer reported fully software and hardware compatible with the IBM-PC.

The Commodore PC 10 is configured with 256K RAM, serial and parallel interfaces, a floppy controller capable of driving four disk drives, two double sided 360K disk drives and an 84-key keyboard. Four IBM-PC compatible slots are avaiable, two reserved for its video card and hard drive controller. The system is expected to be available sometime this spring, though it's not expected to be distributed in the United States.

Hewlett-Packard is expected to be showing their new **Integral Personal Computer**, as well as **The Portable**, the **HP-150 Touchscreen** computer, the **ThinkJet** and **LaserJet** printers and other products.

The Integral Personal Computer is an 512K UNIX based transportable system with an integrated ThinkJet printer, a 9" display and one 3 1/2" disk drive. The computer has a Motorola 68000 microprocessor, and includes HP-UX, HP Window Manager and P.A.M. in ROM.

Atari (Canada) Corporation is expected to be displaying their **ST** and **XE Series** computers, along with pots of supporting peripherals.

The XE series is completely compatible with the XL series, and consists of four models; the 64K **65XE**, the **65XEM** ... a 65XE with extended music capabilities, the **65XEP** ... a portable 65XE with a 5" monochrome screen and a 3 1/2" drive, and the **130XE** ... a 128K version of the 65XE.

Quite unlike the XE series, the ST series consists of two models, differing between them only in RAM. The **130ST** is a 68000 based micro with 128K RAM, graphics modes of 320x200, 640x200 and 640x400 pixels, with a palette of 512 colours to choose from in the latter two modes. Other features include an on-board disk controller, Digital's GEM operating system, a MIDI interface and mouse control. The **530ST** is a 512K version of the 130ST.

Copp Clark Pitman Limited's **Troubleshooting and Repair Guides** for the Apple][and //e, Commodore 64 and IBM PC are expected to be displayed at their booth. The guides ... which require some knowledge of electronics ... allow the reader through troubleshooting flowcharts to diagnose the probable cause of mechanical failure and remedy it. A final chapter on advanced troubleshooting shows the more adventuresome how to perform more complicated repairs.

The guides' suggested retail is $26.95 each.

Apple Canada will be at the show displaying their entire product line, including the **Macintosh**, the **Macintosh XL**, the **Apple //e** and **//c** and the **Apple LaserWriter** printer.

Apple is also expected to have a bevy of Macintosh software on display. **CN!**

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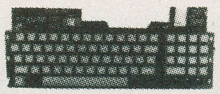

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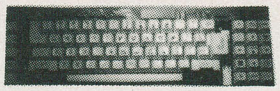

This is a high quality Hall Effect keyboard made by Microswitch of Canada for AES data and now bought by us for 10% of the $169.00 that AES paid for them in 10,000 lots. They are a very good word processing keyboard with both serial and parallel data outputs for use with APPLE and IBM type systems and come complete with a ribbon cable connector and complete pinout. **$24.95**

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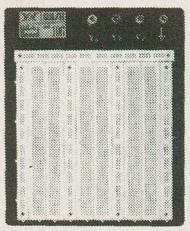

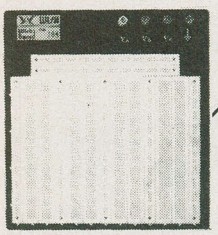

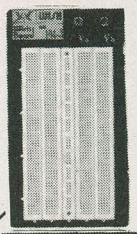

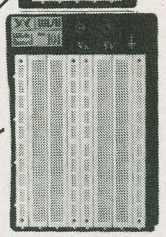

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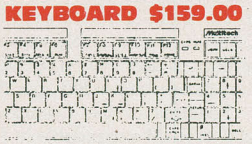

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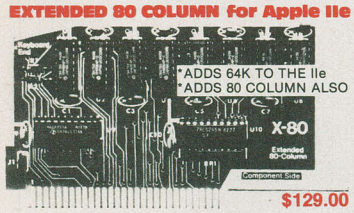

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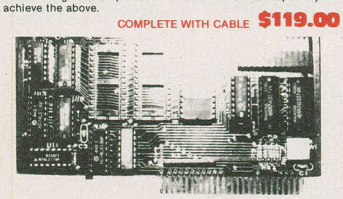

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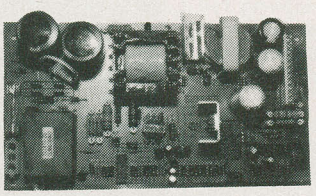

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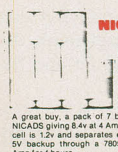

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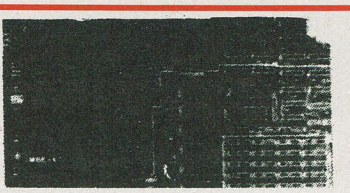

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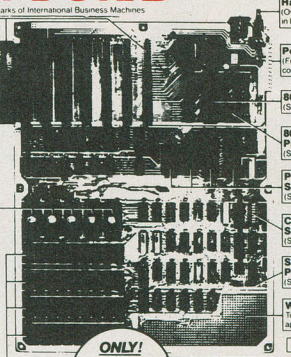

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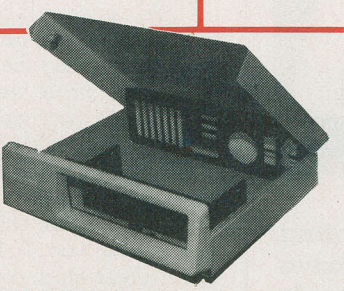

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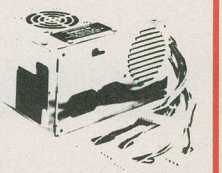

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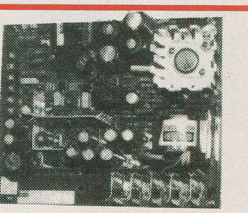

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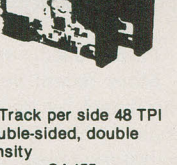

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Circle No. 30 on Reader Service Card.

The WordStar Printer Patcher

If you have a dot matrix printer with rollicking fields of effects and options, you may have been dismayed to learn that WordStar is unable to access them. Dismay no longer... here's a simple patcher to change all that.

by Steve Rimmer

Printers can be the undoing of the best of word processors... certainly if you use WordStar, and unless you either happen to own of the archaic little beasts listed in the WordStar INSTALL printer menu or you're particularly good with DDT, this aspect of electronic text handling will probably do you in, too. While it's usually pretty straight up to configure WordStar to lay some text on your printer, it's often all but impossible to get it to use the intelligent functions of printers its installer has never heard of.

Printer effects are the spice of hard copy.

More recent versions of WordStar have overcome this to some extent by including a better selection of printers in their menus... which is small comfort if your edition dates back to pre-historic times.

In most cases one knows the strings which one has to imbed in WordStar to make one's printer do its thing. The manual that came with yours will probably avail you of a plethora of strange escape sequences and other sundry bytes. However, getting into WordStar is the crux of the circus.

In fact, WordStar maintains what is called a *printer patch area* which is designed to hold these things. You can edit this with the INSTALL program if you're extremely clever, but this is actually less convenient than would be using DDT.

DDT, is in turn, only marginally more convenient than leaving your WordStar disk in the sunlight and hoping that stray cosmic rays will make the necessary alterations.

The program accompanying this article is a printer patch area patcher for WordStar versions 3.00 to 3.20. Note that it will bomb gloriously on version 3.3 and is only for use with CP/M based WordStars... the locations in the MS-DOS version are entirely different.

Ropes and Strings

WordStar... its's probably WS.COM on your disk... is a file, just like a document file. Under CP/M there is no difference... as far as the operating system is concerned... between the two.

We can deal with WS.COM as a random text file from BASIC. If we define the random record length as being 128... the same length as a CP/M logical sector... we can manipulate WordStar from BASIC in very much the same way as the operating system does at the machine language level.

The printer patch area of WordStar happens to start at 696H... or, in BASIC notation, &h696. This happens to be twelve records into WordStar. Because our records are the same length as the sectors, it's also twelve sectors in.

We can change bits of the printer patch area, then, by opening WordStar as a random file, GETting sector twelve into a string, manipulating the string... exceedingly carefully... and putting it back where we found it.

Actually, as it happens, the very last bit of the interesting part of the printer patch area extends into sector thirteen, so we have to handle two of 'em. Still, the technique isn't too weird and easy to see in the code.

This program will do one of several things, depending on how you set it up. To begin with, it will read out the three sectors of WordStar which contain the identifying text that turns up when you boot the program. Among other things, it'll show you the version number of your copy of WordStar so you can avoid destroying an otherwise fairly useful copy of version 3.3.

There are fourteen printer patch stings that the program lets you manipulate. It's designed primary for the proud owners of dot matrix printers. There is other stuff in the printer patch area, but, for the most part these are vectors into machine language routines which aren't nearly so useful at the BASIC level.

When you tell WordStar that you want to turn on the alternate ribbon colour, for example, all it does is to put a control character in your file, control Y in this case. When you print the file... using WordStar's print mode... it will come across the control Y, delete it and print the string which it finds in its printer patch area in the space intended for the alternate ribbon colour string.

There are a number of important things happening here. The most useful of them is that the alternate ribbon colour space in WordStar need not contain a string to change the colour of your printer's ribbon... it won't be a great deal of use if you have a printer with a single ink colour. It can contain any string you feel like putting there. In this case I've had it put the printer in its double strike mode.

The strings in the printer patch area are all of the same form. The first byte of the string holds the number of bytes in the rest of the string. Therefore, for example, the double strike string... seen in line 410 of the program... would be the hex bytes

1B 71

In order to put them into WordStar we would locate the correct

bit of the printer patch area... it's &H06DD... and change it so it contained

06DD 02 1B 71 00 00

The first byte is the length... there are two bytes in the actual string. The next two bytes are the string to be sent to the printer when WordStar encounters a control Y in the file. The last two bytes are zeros because the string we want to send is shorter than the space it has to live in. We could leave these bytes undefined... leave whatever was in there when we found it, as WordStar will only print the number of bytes it's told to by the first byte in the string.

It's important that we not try to install more bytes in the space that WordStar has allowed for as the latter ones would spill over into the next adjacent string. WordStar would then figure that the next string was the length given by the value of the erroneous fifth byte in the first string.

This could result, for example, in having it print out the whole patch area every time you pop for italics.

In most cases, the available space is four bytes long.

```
10 '    ..........................................
20 '
30 '    --- The Godzone WordStar Printer Patcher ---
40 '        Copyright (c) 1985 Steve Rimmer
50 '
60 '    Not for use or distribution by suits, for
70 '    suits, to suits or anywhere within sixteen
80 '    miles of a life form wearing a tie.
90 '
100 '   ..........................................
110 '
120 DEFINT A-Z
130 VERS$ = "2.5"
140 CLS$ = CHR$(26) 'string to clear tube
150 HM$ = CHR$(30) 'string to home cursor
160 SCW = 80 'screen width
170 WS$ = "WS.COM" 'name of WordStar file
180 DEF FNAT$(X,Y) = CHR$(30) + STRING$(Y,10) + STRING$(X,12)
190 DIM DFT$(14)
200 'gemini 10x default strings
210 ESC$ = CHR$(27)
220 'alternate width string (set to Gemini condensed mode)
230 DFT$(1) = CHR$(3) + ESC$ + "B" + CHR$(3) + CHR$(0)
240 'standard width string (set to Gemini elite mode)
250 DFT$(2) = CHR$(3) + ESC$ + "B" + CHR$(2) + CHR$(0)
260 'roll up string (set to Gemini superscript code)
270 DFT$(3) = CHR$(3) + ESC$ + "S" + CHR$(0) + CHR$(0)
280 'roll down string (set to Gemini superscript cancel code)
290 DFT$(4) = CHR$(4) + ESC$ + "T" + CHR$(27) + CHR$(84)
300 'user 1 string (set to Gemini normal font)
310 DFT$(5) = CHR$(2) + ESC$ + "5" + CHR$(0) + CHR$(0)
320 'user 2 string (set to Gemini italic font)
330 DFT$(6) = CHR$(2) + ESC$ + "4" + CHR$(0) + CHR$(0)
340 'user 3 string (set to Gemini underline mode)
350 DFT$(7) = CHR$(3) + ESC$ + CHR$(45) + CHR$(1) + CHR$(0)
360 'user 4 string (set to Gemini cancel underline mode)
370 DFT$(8) = CHR$(3) + ESC$ + CHR$(45) + CHR$(0) + CHR$(0)
380 'alternate ribbon string (set to Gemini double strike mode)
390 DFT$(9) = CHR$(2) + ESC$ + "G" + CHR$(0) + CHR$(0)
400 'standard ribbon string (set to Gemini double strike cancel)
410 DFT$(10) = CHR$(2) + ESC$ + "H" + CHR$(0) + CHR$(0)
420 DFT$(11) = CHR$(1) + CHR$(13) + STRING$(15,0) 'initialization
430 DFT$(12) = STRING$(17,0) 'deinitialization
440 DFT$(13) = CHR$(2) + CHR$(13) + CHR$(10) + STRING$(8,0) 'new line
450 DFT$(14) = CHR$(2) + CHR$(13) + STRING$(5,0) 'carriage return
460 GOTO 2150
470 'do a title
480 PRINT CLS$;
490 A$ = SPACE$((SCW-LEN(A$))/2) + A$ + SPACE$((SCW-LEN(A$))/2)
    : PRINT A$;
500 PRINT STRING$(SCW-1,"_");
510 RETURN
520 'open wordstar
530 A$ = "WordStar Identification" : GOSUB 470
540 PRINT
550 PRINT M$ "WordStar Printer Patch version " VERS$
560 PRINT M$ "Copyright (c) 1985   Steve Rimmer "
570 PRINT
580 PRINT M$ "This version of WordStar is: "
590 OPEN "R",#1,WS$,128
600 FIELD #1,128 AS C$
610 GET #1,1
620 PRINT M$ MID$(C$,26,55)
```

The WordStar Printer Patcher

```
630 PRINT M$ MID$(C$,86,32)
640 PRINT M$ MID$(C$,119,10);
650 FIELD #1,128 AS C$
660 GET #1,2
670 PRINT M$ MID$(C$,1,8)
680 PRINT M$ MID$(C$,17,35)
690 PRINT M$ MID$(C$,53,35)
700 PRINT M$ MID$(C$,89,35)
710 PRINT M$ MID$(C$,125,4);
720 FIELD #1,128 AS C$
730 GET #1,3
740 PRINT M$ MID$(C$,1,31)
750 PRINT
760 PRINT M$ "This must be version 3.00 to 3.20."
770 PRINT M$ "Version 3.30 will crash like an L1011."
780 PRINT
790 PRINT M$ "Hit any key."
800 A$ = INPUT$(1)
810 RETURN
820 'get two sectors # in sec
830 SEC = SEC +1
840 FIELD #1,128 AS A$
850 GET #1,SEC : C$ = A$
860 GET #1,SEC+1 : D$ = A$
870 SEC = SEC -1
880 RETURN
890 'get data into c$, c as index
900 SEC = INT((MEM - &H100) /128)
910 GOSUB 820 : C = (MEM-&H100) - (SEC * 128) + 1
920 RETURN
930 'display the current data
940 STL = ASC(MID$(C$,C,1))
950 PRINT "The field is" BLN "characters long, with" STL "in place."
960 PRINT "They are ";
970 FOR X = C + 1 TO C + BLN
980 Q$ = HEX$(ASC(MID$(C$+LEFT$(D$,64),X,1)))
    : IF LEN(Q$) = 1 THEN Q$ = "0" + Q$
990 PRINT Q$ " ";
1000 NEXT X
1010 PRINT
1020 RETURN
1030 'alternate width
1040 A$ = "Alternate Width" : GOSUB 470
1050 MEM = &H6B5 : BLN = 4 :  GOSUB 890 : GOSUB 930
1060 GOTO 1590 'now go and do edit
1070 'standard width
1080 A$ = "Standard Width" : GOSUB 470
1090 MEM = &H6BA : BLN = 4 : GOSUB 890 : GOSUB 930
1100 GOTO 1590
1110 'roll up
1120 A$ = "Roll Up (for the mystery tour)" : GOSUB 470
1130 MEM = &H6BF : BLN = 4 : GOSUB 890 : GOSUB 930
1140 GOTO 1590
1150 'roll down
1160 A$ = "Roll Down" : GOSUB 470
1170 MEM = &H6C4 : BLN = 4 : GOSUB 890 : GOSUB 930
1180 GOTO 1590
1190 'user 1
1200 A$ = "User 1" : GOSUB 470
1210 MEM = &H6C9 : BLN = 4 : GOSUB 890 : GOSUB 930
1220 GOTO 1590
1230 'user 2
1240 A$ = "User 2" : GOSUB 470
1250 MEM = &H6CE : BLN = 4 : GOSUB 890 : GOSUB 930
1260 GOTO 1590
1270 'user 3
1280 A$ = "User 3" : GOSUB 470
1290 MEM = &H6D3 : BLN = 4 : GOSUB 890 : GOSUB 930
1300 GOTO 1590
1310 'user 4
1320 A$ = "User 4" : GOSUB 470
1330 MEM = &H6D8 : BLN = 4 : GOSUB 890 : GOSUB 930
1340 GOTO 1590
1350 'alternate ribbon
1360 A$ = "Alternate Ribbon" : GOSUB 470
1370 MEM = &H6DD : BLN = 4 : GOSUB 890 : GOSUB 930
1380 GOTO 1590
1390 'standard ribbon
1400 A$ = "Standard Ribbon" : GOSUB 470
1410 MEM = &H6E2 : BLN = 4 : GOSUB 890 : GOSUB 930
1420 GOTO 1590
1430 'printer initialization
1440 A$ = "Printer Initialization" : GOSUB 470
1450 MEM = &H6E7 : BLN = 16 : GOSUB 890 : GOSUB 930
1460 GOTO 1590
1470 'printer di-initialization
1480 A$ = "Printer De-initialization" : GOSUB 470
1490 MEM = &H6F8 : BLN = 16 : GOSUB 890 : GOSUB 930
1500 GOTO 1590
1510 'new line
1520 A$ = "New Line" : GOSUB 470
1530 MEM = &H696 : BLN = 10 : GOSUB 890 : GOSUB 930
1540 GOTO 1590
1550 'carruage return
1560 A$ = "Carriage Return" : GOSUB 470
1570 MEM = &H6A1 : BLN = 6 : GOSUB 890 : GOSUB 930
1580 GOTO 1590
1590 'handle edit
1600 PRINT FNAT$(0,7);
1610 PRINT "The default string is" LEN(DFT$(SEL))-1
     "characters long with" ASC(LEFT$(DFT$(SEL),1)) "in place."
1620 PRINT "They are ";
1630 FOR X=2 TO LEN(DFT$(SEL))
1640 Q$ = HEX$(ASC(MID$(DFT$(SEL),X,1)))
     : IF LEN(Q$) = 1 THEN Q$ = "0" + Q$
1650 PRINT Q$ " ";
1660 NEXT X
1670 PRINT
1680 PRINT "Hit E to edit, S to save, C to copy
     or Q to scoot to the main menu: ";
1690 A$ = INPUT$(1) : IF INSTR("EeSsQqCc",A$) = 0 THEN 1690
1700 IF INSTR("Qq",A$) <> 0 THEN 2130
1710 IF INSTR("Ee",A$) <> 0 THEN 1740
1720 IF INSTR("Ss",A$) <> 0 THEN 1920
1730 IF INSTR("Cc",A$) <> 0 THEN 2060
1740 'edit the string
1750 PRINT HM$
1760 PRINT FNAT$(0,10) SPACE$(70) CHR$(13);
1770 INPUT "Number of bytes in the string";SRL$
1780 IF LEN(SRL$) = 0 THEN 1800
1790 SRL = VAL(SRL$) : IF SRL < 0 OR SRL > BLN THEN 1760
1800 PRINT FNAT$(0,11) SPACE$(70) CHR$(13);
1810 INPUT "Byte to change";BYN$
1820 IF LEN(BYN$) = 0 THEN 1590
1830 BYN = VAL(BYN$) : IF BYL < 0 OR BYL > SRL THEN 1800
1840 PRINT FNAT$(0,12) SPACE$(70) CHR$(13);
1850 INPUT "New value";NBY$
1860 IF LEN(NBY$) = 0 THEN 1590
1870 NBY = VAL(NBY$) : IF NBY < 0 OR NBY > 255 THEN 1840
1880 PRINT FNAT$(0,10) SPACE$(79) FNAT$(0,11) SPACE$(79)
     FNAT$(0,12) SPACE$(79);
1890 MID$(DFT$(SEL),1,1) = CHR$(SRL)
1900 MID$(DFT$(SEL),BYN+1,1) = CHR$(NBY)
1910 GOTO 1590
1920 'save the string back into wordstar
1930 D1$ = DFT$(SEL) : D2$ = ""
1940 IF C + LEN(D1$) > 128 THEN D1$ = LEFT$(DFT$(SEL),(128-C)+1)
     : D2$ = RIGHT$(DFT$(SEL),(LEN(DFT$(SEL))-LEN(D1$)))
1950 MID$(C$,C,LEN(D1$)) = D1$
1960 IF D2$ <> "" THEN MID$(D$,1,LEN(D2$)) = D2$
1970 SEC =SEC +1
1980 FIELD #1,128 AS A$
1990 LSET A$ = D$
2000 PUT #1,SEC+1
2010 FIELD #1,128 AS A$
2020 LSET A$ = C$
2030 PUT #1,SEC
2040 SEC = SEC -1
2050 GOTO 2130 'scoot to the main menu
2060 'copy c$ and d$ to dft$(sel)
2070 IF C + BLN < 129 THEN DFT$(SEL) = MID$(C$,C,BLN+1)
     : GOTO 2100
2080 DFT$(SEL) = RIGHT$(C$,(129-C))
2090 DFT$(SEL) = DFT$(SEL) + LEFT$(D$,(BLN - LEN(DFT$(SEL))+1))
2100 'back to the edit menu
2110 PRINT
2120 GOTO 1590
2130 'scoot back to the main menu
2140 GOTO 2170
2150 'main code
2160 GOSUB 520
2170 A$ = "Main Menu" : GOSUB 470
2180 PRINT SPACE$(27) "You can change..."
2190 PRINT
2200 M$ = SPACE$(13)
2210 PRINT M$ " 1. Alternate width          2. Standard width"
2220 PRINT M$ " 3. Roll up                  4. Roll down"
2230 PRINT M$ " 5. User 1                   6. User 2"
2240 PRINT M$ " 7. User 3                   8. User 4"
2250 PRINT M$ " 9. Alternate ribbon        10. Standard ribbon"
2260 PRINT M$ "11. Printer initialization  12. Printer de-initialization"
2270 PRINT M$ "13. New line                14. Carriage return"
2280 PRINT
2290 INPUT "What'll it be (0 to scram)";A$ : SEL = VAL(A$)
2300 IF A$ = "0" THEN 2330
2310 IF SEL < 1 OR SEL > 14 THEN 2170
2320 ON SEL GOTO 1030, 1070, 1110, 1150, 1190, 1230, 1270, 1310,
     1350, 1390, 1430, 1470, 1510, 1550
2330 'close wordstar and quit
2340 CLOSE
2350 A$ = "Patch Complete" : GOSUB 470
2360 PRINT HM$ + STRING$(22,10);
2370 END
```

Plastic Printers

I've set up this program to install some strings in WordStar which will make it fairly happy with a Gemini 10X. The strings live at line two hundred on. You will certainly want to change them if you have a different printer, and may well want to if you have a

Gemini and don't like my choice of effects.

You can make any of the strings do anything you want them to... so long as you remember what they've been set up for. WordStar's assortment of functions, as stumbled upon in the P menu, isn't really all that great. You'll very likely want to substitute some of the things your printer can do for WordStar's less useful selections.

The four user strings are particularly handy. Like the other bits of the patch area these just point into strings. You can define them as any function your printer can manage with a lead in string of four characters or less.

WordStar handles boldface type by issuing a carriage return at the end of a bold line and going over the line again. If your printer interprets a carriage return as the command to return its print head to the left margin it'll work for you. If it returns its carriage and does a line feed you're sunk... you'll have to define a string to serve as your bold command... possibly the ribbon colour, as I've done here.

In patching WordStar with this program you can either change all the strings in the BASIC source and then run the code or use the editor built into the program. When you select a string from the main menu the editor will display the field in WordStar... what the string is currently set to... and the default field, that is, what you've set the string to in the program in the strings at line two hundred.

If you save the default string into WordStar whatever was in it will be placed in the patch area. You can copy the WordStar field into the default string to edit it... with the C command followed by E, for edit... and then save it into WordStar.

If you just wanted to install all the strings into WordStar as they stand in the program you'd just select each option from the main menu and then save each one.

The Q option returns you to the main menu without saving what you've done.

Bits in BASIC

There is very little else to worry about in using the patcher, with the exception of a minor peculiarity in BASIC. If you PUT a record into a file in BASIC, as we do here when we save a string back into WordStar, you are actually placing it in the appropriate part of BASIC's disk file buffer. You'll probably notice that when you save a sector the disk isn't accessed. This is because making several changes to the printer patch area will always only involve accessing the same two sectors.

This makes the program a lot snappier, but it also means that you have to end the program with option zero to close the file. Under BASIC, closing a file means writing the contents of the file buffer back into the file. If the file isn't closed nothing gets patched.

This simple pot of BASIC can make WordStar considerably more useful. As always, make sure that you try it on a copy of WordStar... don't hack on your original master. **CN!**

Two Pair for the PC

File movers are an essential part of computers and disks. Here's a look at four good ones.... two to exchange data with foreign disk formats and two more to back up those otherwise troublesome copy protected disks.

by Steve Rimmer

Applications software makes a computer useful... utilities make it useable. Clever utilities can make it gloriously useable, and can make previously impossible things foolishly easy. The general specification for utility software should be something that costs less than fifty bucks and overcomes something insurmountable.

Two of the most common questions which people seem to ask about using PCs are how to get data from other systems onto one and how to back up their expensive copy protected software. We'll look at several approaches to both of these in this feature.

Formats Forever

One of the most stunning small bits of code I've encountered for the PC is a fairly modest package called Media Master, by MDG and Associates. It is one of several programs around which allows an IBM PC... or something compatible... to read and write disks from other machines. In particular, it will exchange data files with dozens of CP/M based computers without the use of modems, serial cables or other technological nasties.

The principal behind Media Master is simple. It simply sets up the disk deblocking parameters of one of the PC's floppy drives so as to make it suitable for handling disks of another format. However, this isn't something you can normally do though a couple of patches with DEBUG. This thing works extremely well and pretty simply, belaying its complexity.

The usefulness of Media Master is primarily in its application with a number of very popular programs. There are quite a few applications, such as WordStar and SuperCalc, which are available in versions for both CP/M and MS-DOS computers. The programs themselves are not transportable... moving the CP/M WordStar over to a PC and running it would create a splendid crash... but the files that they create are.

There are also pots of BASIC programs... and, for that matter, programs in a number of higher level languages... which can be exchanged between differing systems and patched to work.

In using Media Master, one runs the main program on the disk and "logs in" a new format for one of the system's drives, generally drive B on a two drive floppy system or drive A on a hard disk system. The program will thereupon allow one to format a disk in the selected drive, check out the directory of a foreign disk and type, read, write and erase files.

There are three kind of huge menus of formats to choose from. I've reproduced the menus from our version of Media Master here, but I imagine that the authors of the package will update these from time to time.

The only hassle that Media Master has is in figuring out the format of an unknown disk, a process which can take some time. It lacks any way to have it automatically check out an amesiatic format for each of the ones it recognizes until it comes up with a winner.

In use Media Master is really quick, extremely simple to use and unspeakably reliable.

By the way, if you have an Apple and have been scanning the list of formats for it you'll have to contain your sorrow. The IBM's drives just won't read Apple tracks even with clever software like this little guy.

Rather more widely advertised than Media Master, and with marginally better packaging, Uniform, by MicroSolutions, has turned out to be a bit of a disappointment for many users. It's considerably cleverer than Media Master, loading itself in as an invisible device driver when the system boots which actually makes one of the system's drives behave like a foreign drive at the DOS level. One thereby simply copies files with COPY.

Uniform is extremely flexible, handling eight inch drives, ninety-six track drives and single density drives in addition to the PC's standard hardware. It can be controlled by a small utility which comes with it so as to be able to create batch files that perform complex manipulations of foreign disks.

When it works Uniform is great. It has rather different formats available than does

Media Master, but it handles them very well. However, that qualifier is important. While I've never encountered a computer that didn't like Media Master, I had a bit of a search for one which would tolerate Uniform. Only a real PC, it seems, will allow one to use all of Uniform's formats.

Uniform seems to particularly abhor some of the new sort of legal BIOS's when they're connected to anything other than a real tandon drive. It barfed on the Tandy 1200D, for example, a computer which seems to be about as compatible as one could ask for.

Allowing for the hassles with Uniform, both of these packages work quite well. Both were well documented and seemed to be supported by their manufacturers. We can't always tell about this... they're helpful to me, but, then, you'd expect that.

Neither of the these packages were copy protected... three cheers... and neither of them will talk to copy protected disks.

Avast

I have a seething contempt for people who copy protect the software they sell. There is nothing more worrisome than coming to depend on a disk you can't back up. I love unlockers and back up utilities... they make you feel so secure, y'know...

There are two PC utilities for backing up copy protected disks that I've come across... they're both pretty cheap, and it's probably worth having them both. Both are useful... neither are optimum.

The most useful of the two is a Canadian package called CopyWrite, by Quaid Software. It's an interesting little spud which copies whatever it's fed one track at a time onto another disk... or, rather, tries valiantly.

As with virtually all backup utilities, CopyWrite leaves you with a second equally uncopyable disk... unless you run CopyWrite again. It doesn't destroy the copy protection. This is probably for the better, as it makes it a bit less likely that one will go passing the copies around.

Unlike Copy IIPC, which we'll get to in a moment, CopyWrite is a manual backup system. If someone comes up with a copy protection scheme which foxes it, the guy who wrote it has to write a new version. There's a return policy that comes with the system... you can send back your old disk and fifteen bucks for the latest edition of the software.

Unfortunately, CopyWrite seems to lack any ability to figure out new protection trips on its own initiative. Quaid issues a new updated version once a month and, at fifteen bucks a crack this may well be deliberate. In other words, in order to keep CopyWrite writing, one must continue to pay for it. A two month old CopyWrite is largely useless unless one wants to back up old software.

There are a number of things which will fry CopyWrite all by itself... Prolok disks, for example... those little high tech munchkins with the laser holes in 'em... do it in. In this case one must load a program called Ramkey into memory before one tries to use a copy of the software one has backed up. Ramkey comes with CopyWrite.

Ramkey is surprisingly effective, but, again, it seems to get obsolete quickly. It also ties up disk space and eats a bit of RAM.

CopyWrite works, but keeping it working is an expensive habit.

Copy IIPC, by Central Point Software, on the other hand, seems to be a bit cleverer. There are things that it won't back up which CopyWrite will, but it does seem to be able to work its way through some software which CopyWrite can't handle until it has been upgraded.

Copy IIPC is considerably less involved than is CopyWrite. It pretends to be the MS-DOS disk copy utility, working in about the same way. It has a host of colourful error messages for those situations in which it finds something it can't deal with. It's also a lot quicker than CopyWrite... although, as I said, not always as effective.

Both programs were moderately good at spotting unworkable copies. If they can't get it together they'd generally say so, rather than passing the bad data and letting you find out when you tried to run the stuff.

If you use protected software both of these things are probably worth what they cost. Certainly if you buy CopyWrite to handle a single package... which would obviate the need to upgrade it... it's a pretty good deal.

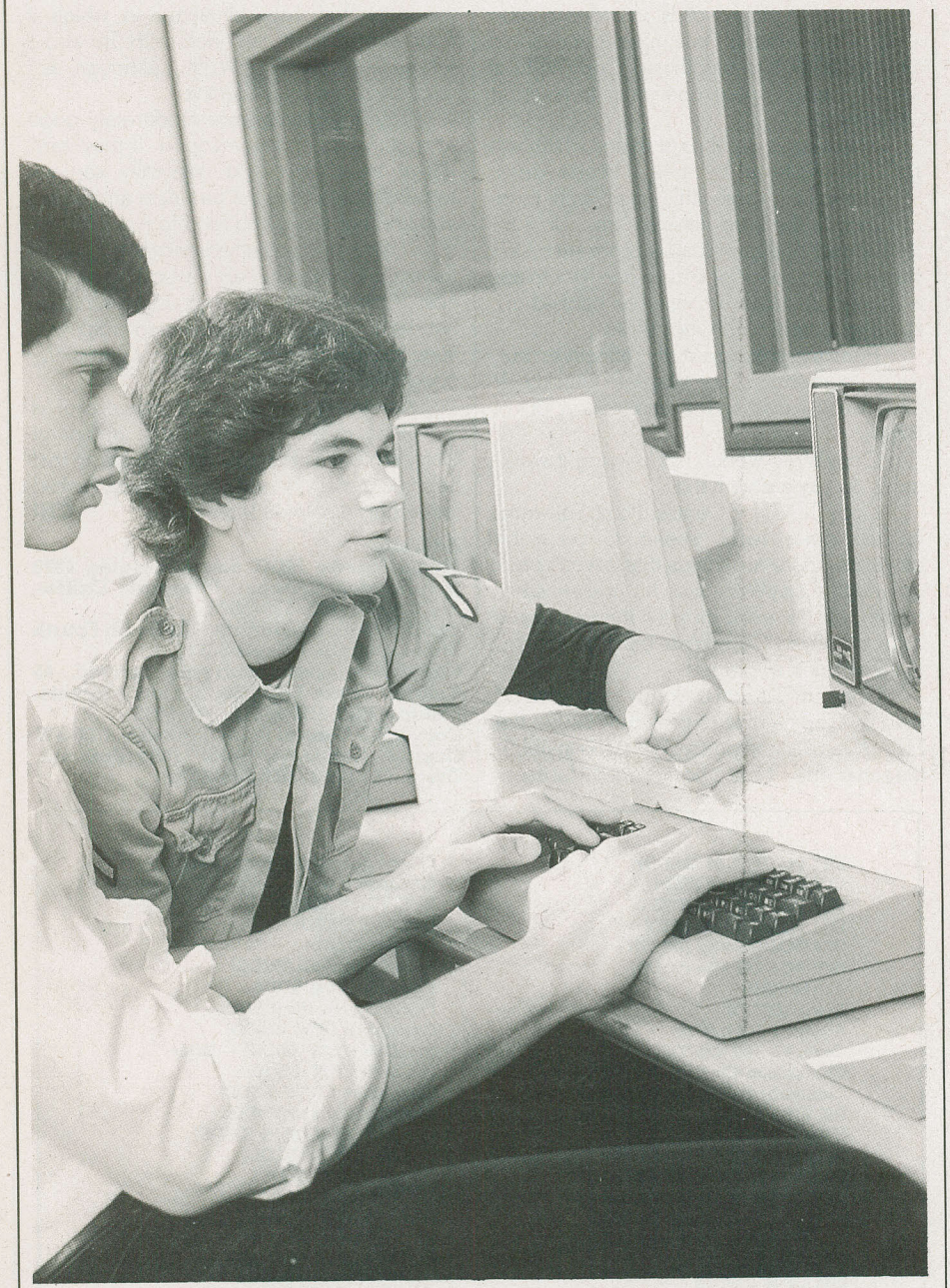
As a final note, attempts by several of us to talk to Robert McQuaid, the author of CopyWrite, has led us to the conclusion that he's in a generally bad humour when asked for technical help on Mondays. **CN!**

Addresses:
Media Master: MDG and Associates, 4573 Heatherglen Crescent, Moorpark, California 93021 1-805-529-5073
Uniform: Micro Solutions, 125 South Fourth Street, Dekalb, Illinois 60115
CopyWrite: Quaid Software Limited, 45 Charles Street East, Sixth Floor, Toronto, Ontario M4Y 1S2 1-416-961-8243
Copy IIPC: Central Point Software, 9700 SW Capitol Highway, Suite 100, Portland, Oregon 97219 1-503-244-5782

Media Master's list of Formats

IBM PC CP/M-86 (DSDD)
IBM PC CP/M-86 (SSDD)
IBM PC-DOS 1.xx (DSDD)
IBM PC-DOS 1.xx (SSDD)
IBM PC-DOS 2.xx (DSDD)
IBM PC-DOS 2.xx (SSDD)
Actrix (SSDD)
Actrix (DSDD)
Avatar TC10 (DSDD)
Casio FP 100 (DSDD)
Chameleon CP/M-80 (DSDD)
Columbia MPC CP/M-80 (DSDD)
H/Z Z100 Z-DOS 1.1. (DSDD)
H/Z Z100 Z-DOS 1.1 (SSDD)
H/Z Z100 Z-DOS 2.0 (DSDD)
H/Z Z100 Z-DOS 2.0 (SSDD)
H/Z Z90 40 trk 1k blk (SSDD)
H/Z Z90 40 trk 2k blk (SSDD)
Heath w/Magnolia CP/M (SSDD)
IDEA Bitelex (SSDD)
ISM CP/M (DSDD)
Insight Dev. IQ-120 (SSDD)
Kaypro II/2 (SSDD)
LNW-80 (SSDD)
Osborne 4 (DSDD)
Osborne Osmosis (SSDD)
Otrona CP/M (DSDD)
PMC Micromate (DSDD)
Reynolds & Reynolds (SSDD)
Sanyo CP/M (DSDD)
Superbrain (DSDD)
Superbrain Jr. (SSDD)
Systel II (SSDD)
Systel III (DSDD)
TI Professional CP/M-86 (DSDD)
TI Professional CP/M-86 (SSDD)
Cromemco w/Int'l Term (DSDD)
Cromemco w/Int'l Term (SSDD)
DEC VT180 (SSDD)
Davidge (DSDD)
Digilog (DSDD)
Epson Multifont (DSDD)
Epson QX-10 (DSDD)
Fujitsu Micro 16s (DSDD)
Groupil III CP/M (DSDD)
H/Z Z100 CP/M (DSDD) – Later
H/Z Z100 CP/M (SSDD)
Cromemco CDOS (SSDD)
Lobo Max-80 512 (SSDD)
Micral 9050 CP/M-80 (DSDD)
Morrow MD 11 (DSDD)
Morrow MD 2 (SSDD)
Morrow MD 3 (DSDD)
NCR Decision Mate 5 (DSDD)
NEC PC-8001A (DSDD)
NEC PC-8001A (SSDD)
Olympia ETX II (SSDD)
Olympia EX100 (DSDD)
Osborne (SSDD)
M. Lobo Max-80 (SSDD)
TRS-80 FEC T805 (SSDD)
TRS-80 III Hurr. Labs (SSDD)
TRS-80 III w/Mem Merch (SSDD)
TRS-80 IV CP/M + (SSDD)
TRS-80 IV Mont. Micro (SSDD)
Teletek 40 trk (SSDD)
Toshiba T100 (DSDD)
TurboDos (DSDD)
Wang Maws CP/M (DSDD)
Xerox 820 II (SSDD)
Zorba 40 trk (SSDD)
TRS-80 FEC CP/M (SSDD)

Computers in Canadian Education



The widespread use of microcomputers has affected the lives of almost everyone in Canada, none more so than students. The past few years has seen the initial steps in the application of micros to education. There are still a few stumbling blocks, though.

by Roger Allan

The state of the microcomputer in the classroom is not something that can be easily defined in twenty five words or less. This may do something to explain the length of this feature.

Few will dispute the potential for learning in this powerful application of technology. The areas of disagreement that do exist, and they are fairly huge, are over how the computer should be used, and to what ends. The schisms created over these issues have been the cause of countless committees, reports, conferences and papers.

The question of the academic use of microcomputers is anything but a trivial one. While still very much an infant technology, it seems clear that by the time contemporary public school students graduate from high school, computer literacy may well be as essential as paper literacy was to their parents.

Across The Board

There are reasons why the educational community can't make up its collective mind a lot of the time. Some will argue that it is all the British North American Act's fault. It granted responsibility to the provinces for matters educational. In the days when the act was written that responsibility involved what we now call elementary education. The higher levels, in general, were under the auspices, directly or indirectly, of various religious orders.

This seemed a fair enough division of power and responsibility at the time as there weren't many students to start with. Furthermore, it was difficult to control education a thousand or more miles away due to poor transportation and communications. There were two languages to deal with, and deep seated and mutually exclusive religious beliefs. Finally, the country was largely agricultural, and, as such, only part of the population needed more schooling than the ability to read and write.

Social realities, needless to say, have changed, yet the legislative underpining remains, bracketing our educators' actions within a bodice of 1867 vintage. There are ten provinces, two territories and a federal government octopus all interested in computer assisted instruction and all determined to say where and how the funding monies are to be allocated. Since there are a limited number of tax dollars available, the question arises as to how to best spend them.

As the provincial authorities rarely agree on anything, and as individual ministers are not in a favourable position to

take initiatives in the area of education, the result of all this contemporary antiquity has been an ever so politely boiling three piece suited morass.

And that, in the words of a confused adolescent going through an identity crisis, is the rub.

For a start, the provinces cannot even agree on what to call the subject. Some provinces refer to it as "computers in education", others "computer instruction", still others "computer based learning" and even still others "computer assisted instruction". Saskatchewan holds the record in this regard. Depending which document you refer, one will find it referred to by all of the above titles, as well as "computer managed instruction", "computer assisted learning", "computer learning" and "computer science". There is hope; at least each of the titles involves the use of the word "computer", which I suppose is a step in the right direction.

Having failed to come to any sort of agreement as to what to call it, it is hardly surprising that there is no agreement among the provinces as to what to do with it.

A Quick Once Over

British Columbia's CAI policy is currently in a state of flux due to budgetary restraints. It's supposedly based on IUMP, the four year old paper more properly known as the "Instructional Use of Microcomputers: A Report on B.C.'s Pilot Project". The report's major finding was that "the single most critical issue in the use of the microcomputer in the schools of B.C. is the acquisition, development and sharing of quality CAI materials relevant to the BC curriculum."

To this end, B.C. created an organization known as "Evaluations: Microware" through which teachers undertake to appraise educational software. They have done a good job, with several hundred programs passing through their process, a derivative of the MicroSift testing program developed by the North West Educational Laboratory. Only about a quarter of all programs reach the "recommended for purchase" level, the balance falling by the wayside either due to their not fitting the B.C. curriculum, having poor documentation, just plain not working and just plain giving the wrong answers.

In the realm of hardware, there are no provincial policy standards for school board acquisitions, though it appears that most of the micros currently in use are Apples or Commodores and a few TRS 80's with the Acorn coming up hard in the back stretch. However, two years ago an independent company, JEM Research in Victoria, determined in a government funded report that the Apple II is the "preferred hardware". How this will affect future purchases is unknown.

The lowly students are somewhat caught between a rock and a hard place. It all depends on their particular teachers, and what they want, what they have available, and what the school boards will let them do. The only unity is that the government will pay for at least one micro per school on which to run either the *CHOICES* or *P.C. Directions* career guidance programs.

The province of Alberta's involvement in educational computing is most recently predicated on the report of the "Minister's Task Force on Computers in the Schools", which published its findings in 1983. Essentially, Alberta Education's policy is founded on the report's determination that the fundamental thrust of the teaching or use of computers in the classroom is to make sure that graduates of the school system are computer literate.

At the elementary school level this means placing a strong emphasis on an overall awareness of computers in society, including their application to everyday life. The junior high school unit is designed to foster a functional knowledge of computers and their capabilities for problem solving. At the senior high school level the program stresses critical understanding of the implications and effects of the use of computers in society. Hardware is supposedly to be standardized on Bell and Howell "Black Apples", licensed Apple compatibles "hardened to the tactical environment of the class room", although a variety of different types have been sold lately, including the ICON.

Most interestingly, Alberta Education established a centralized evaluation process known as "The Clearinghouse". Here, teachers who have been specially trained evaluate software through a fairly rigorous procedure. It customarily takes nine months. So good is the process that Manitoba and Saskatchewan have joined, with the Maritime provinces doing so effective in the early new year. *[It was still the old year when Roger wrote this. –ed]*

Odd Numbers

The Yukon has the dubious distinction of having the smallest number of students, about forty two hundred, and the smallest number of micros, eighty five at last count, and, yet the highest ratio of micros to students. There are forty-nine for each computer.

There are problems indigenous to the North, however. The distances between schools is very great, slowing down teacher training. They have a short school year of 187 days less time off when the temperature is less than fifty below. Finally, there are difficulties with power fluctuations.

None the less, the Yukon is attempting to keep in step with its neighbours. Technologically, the Yukon's emphasis is on Apple hardware, which has the added ability of being able to up link easily via satellite with an IBM mainframe in Vancouver and the ability to handle the Romanesque script used in writing the native people's languages.

Essentially, their thrust is to develop courses, implement them, and then when things get rolling to take and overview and develop a more formal policy. If pushed to state a formal policy, they say they tend to follow Alberta.

The North West Territories are in a similar sort of climactic position as the Yukon and have adopted a similar sort of response. They leave their neighbours to the South to the mental slogging and report writing, and just follow along. They have, however, over two hundred and fifty teachers trained in use of micros, which is rather good since they only have twelve thousand students. This amounts to one trained teacher for every fifty students.

Saskatchewan's efforts are predicated on the "Report of the Exploratory Committee on the Academic Uses of Computers in Saskatchewan" which released its report some years ago. The Report's thrust was that computer literacy and computer science, while sometimes treated as separate components, should be interleaved into a graduated three level system. The first level involves the student's understanding of what the computer means to society. The second level provides the student with some more practical knowledge; remedial material in language skills, problem based dialogues in physics, and so on. At the third level the students should learn how to write their own computer programs and to construct their own instructional developments in the computer language used.

Regretfully, there isn't much money to put the theory into practice. In an attempt to overcome the financial aspect, Saskcomp, the provincial crown corporation for the supply of computer products and services, purchased a large number of Bell and Howells and sold them at cost to the school boards. Further, Saskcomp joined MECC, and now provides copies of their programs, enacts requests for program revisions and generally acts as a clearing house for computer based educational material. They are also members of the Clearinghouse Project.

Computers in Canadian Education

Moving East

Manitoba policy is grounded in their "Pilot Guide", published in 1982. Essentially, courses developed under this guide provide for a major emphasis on problem solving and computer programming. The intent is that the student will use the computer as a means of learning problem solving skills.

The techniques for problem solving learned in this way are supposed to be applicable in disciplines other than computer science. Through instruction and practice in programming, programming style is to be emphasized. Computer components and terms are to be defined, the limitations and advantages of different types of computers are to be presented and the course outlines are to be structured so as to be usable on any computer or in any computer language.

The computers currently used are Apples, TRS 80s and PETs. They belong to the Clearinghouse Project.

Ontario's efforts in the field of CAI can be succinctly summarized by one observation. They are the only province with a national publicity budget to tell the rest of us what they are doing and, needless to say, how well they are doing it.

Essentially, the Ontario Ministry of Education's actions fundamental basis is that there should be a provincial computer network, called ECNO, with each part interrelated and speaking a common language, with access to the system for pretty near everything by pretty near everyone. This is rather a tall order. However, unlike many of the other provinces, Ontario has the money and industrial infrastructure to put into practice what they preach.

First, Ontario decided they needed their very own computer, one specifically designed for use in the educational setting. They decided that there was no other computer on the market which was suitable, although with hindsight the Acorn pretty well met their specification and was already in production.

To this end, money was drawn from the Board of Industrial Leadership and Development, BILD, and after a certain amount of toing and froing, a contract was awarded to CEMCorp for the development of the Canadian Educational Microcomputer or ICON. This is what is irreverently known as the "Bionic Beaver"; its publicists' attempt to have it known as SAM, the "Student Approved Micro", has deservedly fallen flat on its face.

Most recently, CEMCorp has linked with Burroughs, producing the possibility of international sales.

To help market the ICON with all its peripherals, the Ministry will subsidize school board purchases quite handsomely. The machine is currently in mass production and is being fed out to the various boards.

Secondly, the Ministry decided that they needed a body of high quality courseware. To that end the "Exemplary Learning Materials Project" was funded. So far, more than thirty programs, all of universally high quality, have been developed, with more on stream. Ontario purchases licenses for this material under the Crown Right in Ontario, permitting all schools in the province to have access to the programs for free. The cost of this will be about seventy five million dollars, plus the ongoing cost of ELMP.

Quebec, after waffling around for a while, and despite a sequence of changes among education ministers, developed a plan entitled "Le Virage Technologique", which translates as "technology: the turning point". It includes the introduction of some seven thousand micros from Bytech/Matra into the schools, with courseware drawn from France's extensive pool. They have stood firm against participation with other provinces as to networking, the Clearinghouse, and so forth, for fear of a loss of identity, even in translation.

The Maritimes

New Brunswick has a policy whereby the usage of computers in school for the teaching of all disciplines should not be imposed from above by the department itself, but rather that traditional methods of teaching should be used, with the introduction of computers only if it is felt that such introductions would be of benefit. As such, each educational discipline committee is to look at computers in that discipline and see whether they would be of use and if so, how.

To help out, the department has placed a heavy emphasis on teacher training, with some six thousand having passed through the series of workshops. They are joining the Clearinghouse Project, and belong to a Maritime based mutual help organization.

Nova Scotia has the attitude that computers in education would be to provide a core curriculum exposure to computers for all students before they leave school at age sixteen. As such, the ministry is in the process of developing a resource centre in Halifax, and is involved in the development of a data bank of good software programs. They are joining the Clearinghouse.

Prince Edward Island has a far more common sense approach to the subject than is generally found elsewhere in the country. Their thrust is "let's go easy and not get carried away by the glitter", to get the students literate but not hybridize their training into sciences and maths only. They are working towards building up a body of teachers that knows what it is doing before plunging to extensive acquisitions.

As for equipment, their "Report of the Advisory Committee on Computers in Education" makes it clear that there is just too much hardware available of widely varying qualities and capabilities, costs and effectivenesses to make a definitive evaluation at this time. In addition, there exists a panoply of software which may or may not run on any single piece of equipment and is often deficient in quality itself. As such, purchase decisions are to be left to the individual teachers and schools, who are to predicate their decisions on the software available for the specific use they have in mind.

Newfoundland is still in the process of developing a policy. There was a conference this past autumn, but a formal statement has yet to be extracted from its deliberations. As such, any micros in the schools are generally used for a computer literacy course for senior level students, customarily taken by students in Grade eleven.

The Report Card

Having read through what might be summarized as a distillation of provincial red tape you might well ask why there exists this confusion as to what the computer in the classroom is to be used for. Is teaching Johnny to read in British Columbia so different than teaching Sheila in Nova Scotia?

There is hope. A committee struck by the Council of Ministers in 1981 has developed a plan which they will have presented to the ministers at their annual meeting in January. It is predicated on work done by JEM Research in Victoria, which was essentially a cataloguing project.

The committee's proposal, according to Lorne Smith at the Ontario Ministry of Education, consists of a national data bank of software evaluations which can be drawn down on by any educational authority. Further, the evaluations will be essentially standardized, thereby having the same relevance regardless of which province undertakes the evaluations. It therefore represents the most significant national step forward in the area of computers in the classroom to date.

Whether the Ministers will in fact accept the proposal has not been determined by press time, but if they do, the cost savings will be enormous, and the ease with which teachers will be able to determine the quality of potential software before buying it will be a quantum leap forward. **CN!**

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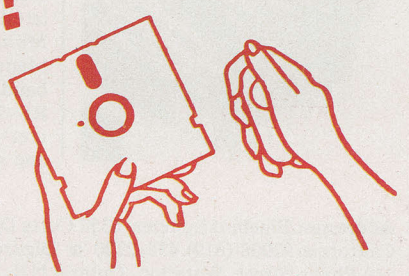

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COMPUTER PRESS

continued from page 6

Tax News

TORONTO, ONTARIO — At a meeting of the Information Centre Exchange, *Richard Morochove* of *Wm. Eisenberg & Company* brought up an intriguing fact: "Many individuals and businesses are unaware of the tax deductions available to microcomputer owners."

Microcomputer tax breaks vary depending on the type of equipment purchased and its use. According to Morochove, "Microcomputer hardware including the system unit, monitor, disk drives and so on qualify for a 15 per cent deduction of its cost from taxible income in the year of purchase *if used for business purposes*. In subsequent years the deduction is increased to 30 per cent of the remaining cost on a declining balance basis.

"If a microcomputer costs $5,000 you could deduct $750 in the year of acquisition (15 per cent of $5,000), $1,275 the second year (30 per cent of $5,000 less $750), and $892 (30 per cent of $4,250 less $1,275) the third year.

"If the microcomputer is used for manufacturing and processing purposes, the deduction is even higher: 25 per cent of the cost the first year, 50 per cent in the second, and the remaining 25 per cent in the third year. In addition, your new manufacturing micro qualifies for an investment tax credit which could be 7 per cent of its cost in Southern Ontario, more in other regions of Canada."

Applications programs, such as word processors, databases and spreadsheets are deductable, too. "Half the cost of these applications programs are deductable in the year of acquisition with the remainder deductable from taxable income the following year." Operating systems are deductable on the same basis as computer hardware.

Employees, however, normally can't claim the above deductions, as Revenue Canada assumes the employer will. Commissioned salespeople, though, generally have more latitude in their expense budgets, and may be able to justify deduction.

"If you use a microcomputer for a small business sideline at home such as bookkeeping or word processing service, you are entitled to all of the available microcomputer tax deductions. If your sideline business loses money during its start up phase you can deduct these losses from your regular employment income and cash in a tax refund," maintains Morochove.

Wm. Eisenberg and Company is located at 45 St. Clair Avenue West, Toronto, Ontario M4V 1L3 (416) 964-1700.

Racore Corporation has released two products to enable the IBM PCjr to communicate with IBM AT computers. The **ATcessory** is a 1.2 megabyte floppy drive, parallel port, clock/calendar, DMA controller, PC/PCjr mode switch and separate power supply. **Racore-Net** is a LAN allowing up to 16 IBM micros of any variety to be linked together...

Passport Designs Incorporated has expanded its Polywriter music printing system to include two more printing packages for Apple-based MIDI systems. **Leadsheeter** prints out sheet music in Treble Clef/Piano score format. **Polywriter Utilities** convert Polywriter and Leadsheeter music graphic files into MIDI/4, MIDI/4+ and MIDI/8 sequencer files...

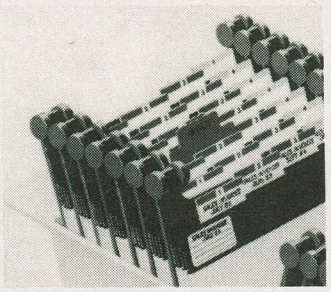
A new spreadsheet program from *SuperSoft Incorporated*, **ScratchPad Plus** offers a number of attractive features: up to 25,000 entries, a user-defined grid of up to 9,999 columns wide or 9,999 rows deep, never needs more than 192K of memory, data transfer capabilities and more. The program operates under CP/M-80, CP/M-86, MS-DOS, or PC-DOS...

Hayes Microcomputer Products has begun volume shipments of their **Smartmodem 2400**. The modem — downward compatible with all Smartmodem models — features touch-tone and pulse dialling, full- and half-duplex communications, auto-answer and autodial, voice and data capabilities and 2400 baud operation...

Bluebird Systems has introduced **SuperDOS/286** and **Business BASIC/286** for the IBM AT. Under SuperDOS/286, an AT can support up to 24 users sharing up to 82 megabytes of disk storage. As Business BASIC/286 is a superset of Data General's Business BASIC, AT users can take advantage of the decade-old library of Data General BASIC programs...

A new 5-model line of monochrome monitors with variable horizontal scan rates has been introduced by *Electrohome Limited*. The **EVM Vari-Scan** line ranges from 9" to 23" models, and adjusts to any frequency from 15 to 25 KHz. Standard features include P4 or P31 phosphors, anti-glare display and a video amplifier providing 16 levels of black, grey and white...

Hadak Security Incorporated's **Visi-Disk** is an organizational system for storage and retrieval of 3 1/2", 5 1/4" or 8" floppies. Features include visibility, master dividers, red 'out' markers to indicate positioning of disks in use, a translucent cover and a lock...



The next best thing to a compiler, *WordTech Systems*' **dBINDEX** is a set of utilities including programs to quickly index, sort and pack dBASE III data files. Using faster algorithms and directly accessing more memory than Ashton-Tate's interpreter, the utilities can be invoked directly from the IBM's operating system or from dBASE III using the RUN command...

The **Canadiana 212A** modem is the latest offering from *SwitchCom Manufacturing Incorporated*. Manufactured in Canada, the 1200 baud modem has user selectable RS-232C interface control, user-definable escape sequences and more...

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30 PRINT"YOU MUST FIND THE SECRET TREASURE"
40 PRINT"HIDDEN IN THE DUNGEONS. YOU HAVE"
50 PRINT"30 TURNS TO FIND IT IN A 10 x 10"
60 PRINT"GRID. DRAW A MAP ON GRAPH PAPER."
70 PRINT"-COMMANDS: N,S,E,W,QUIT":PRINT
80 PRINT"COMMAND";:INPUTC$
90 T=T+1:IFT=30PRINT"*** YOU TOOK TOO LONG ***":GOTO300
100 IFC$="QUIT"END
110 IFC$="N"THENY=Y+1
120 IFC$="S"THENY=Y-1
130 IFC$="E"THENX=X+1
140 IFC$="W"THENX=X-1
150 PRINT"YOU ARE AT DUNGEON:"X","Y
160 IFX=X1ANDY=Y1PRINT"*** CONGRATULATIONS, YOU FOUND THE TREASURE":GOTO300
170 GOTO80
300 PRINT"SCORE:";INT(1000/T):END
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